

# 321 CONTACT

Happy  
Holidays!

What is in these  
gift boxes? For  
more clues, turn  
to page 31.





# Splat!



There's got to be a better way to slice a tomato! Actually, the people who took this picture weren't making a salad. They were trying to stop the action of something that happens so quickly, your eyes can't see it.

This is just the beginning of our special issue on senses. You can find out how this special photography works, and see more pictures of things that are quicker than a wink. Just turn to page 14.

And that's not all. You can watch a whole week about senses on 3-2-1 CONTACT's television show. Check your local listings to see when the show is on in your area.

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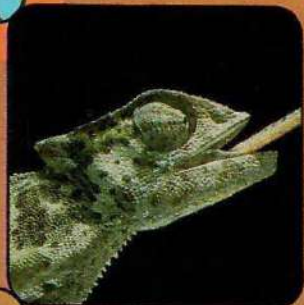
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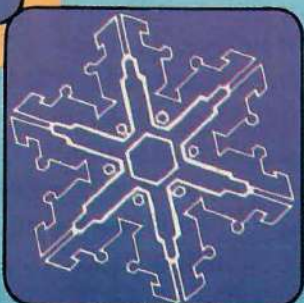
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# YOU VS. THE ANIMALS

**MAKING GOOD USE OF SENSES**

by Susan Meyers

Did you ever think how often you say “See you later” or “Let’s have a look”? You use seeing words because sight is usually a person’s most important sense. But if you were a dog, you would count on your nose to tell you much of what you need to know about the world. If a dog could talk, it wouldn’t say, “Let’s have a look.” Instead, it would say, “Let’s have a sniff.”

For all animals—including human beings—the senses are windows to the world. Because these windows are different for each kind of animal, the picture that each animal gets of the world is also very different. Bats can hear sounds that you can’t hear at all, for example. And bees can spot colors that you’ll never see.

Just for a change, try to imagine how the world would seem to you if you used your nose like a dog or your ears like a bat. Odors would smell very different. And noises would sound unusual. But they would still make sense.

## Seeing

Compared to most animals, people have an excellent sense of sight. You can read the tiny letters on an eye chart across a doctor’s office. But try to read it from half a mile (.8 km) away. You wouldn’t even see the chart...unless you were a falcon! Falcons, hawks and other birds of prey have excellent long distance eyesight.

They use it to find food. A falcon circling in the air can spot a dragonfly half a mile (.8 km) away.

How far your eyes can see is only part of the story. Sometimes your sharp eyes can’t see things right in front of them—because you’re in the dark. But animals like cats have eyes that see better at night than yours do. A cat stays awake at night. Its eyes must open very wide in the dark. The pupils let in every possible bit of light. That lets a cat prowl around safely rather than bumping into walls as you would do.

Some animals can see things that are invisible





**Left:** Eagles and other birds of prey can see better and farther than almost any other animal. They use their sharp eyesight to spot small animals and fish that they catch for food.

to you. Bees see a color called *ultraviolet*. Many flowers have ultraviolet patterns on them. A bee's eyes can spot this pattern. Using it, the insect can find flowers filled with nectar.

## Hearing

Your ears can hear an ice cream truck's bell about three blocks away. But a dog can hear that same bell about 30 blocks away. Dogs also hear sounds you can't hear at all. The high-pitched sound of a "silent" dog whistle can't be heard by people's ears. But a dog hears it.

Speaking of hearing high-pitched sounds, the real champ in the animal world is the bat. These mammals don't just hear super high sounds. They create them, too. A bat sends out a high-pitched squeak as it flies. The squeak creates sound waves that hit walls and trees and bounce back as echoes. A bat can hear these echoes and use them to find its way around. It can even catch insects as they fly through the air.

At least bats and dogs have ears on their heads. But some animals find that hearing organs come in just as handy in other places. Mosquitoes use their antennae for hearing. Some locusts even have a kind of ear located on their legs! ➡



**Above:** A dog's ears are much more sensitive than yours. They can hear sounds you can't hear at all!

**Left:** Moles have poor eyesight. In fact, some can't see at all. But their sensitive skin makes up for that. Moles feel even slight vibrations that alert them to danger.





## Touch

Your sense of touch comes from nerves in your skin. It tells you when something as light as a fly crawls up your arm. It also tells you when your bathwater feels too hot or when the weather outside is too cold.

To you, the sense of touch is helpful. But for some animals that live in the dark, touch is the most important of all their senses. Take the mole, for example. This animal spends most of its life burrowing in the ground. Since it can hardly see at all, its keen sense of touch serves as a substitute for sight. A mole's skin reacts to the tiniest vibrations in the earth so that it can escape whenever danger approaches.

Animals sometimes have different sense organs for touch than you. Whiskers help a cat to feel if a space is wide enough for it. And the whirligig beetle uses its feelers to sense the vibrations of other swimming insects. This helps it catch food as it glides across a pond.

## Smell

For you and many other living things, the sense of smell works with the sense of taste. Smell helps you learn about a hamburger at a distance while taste lets you sample it close-up.

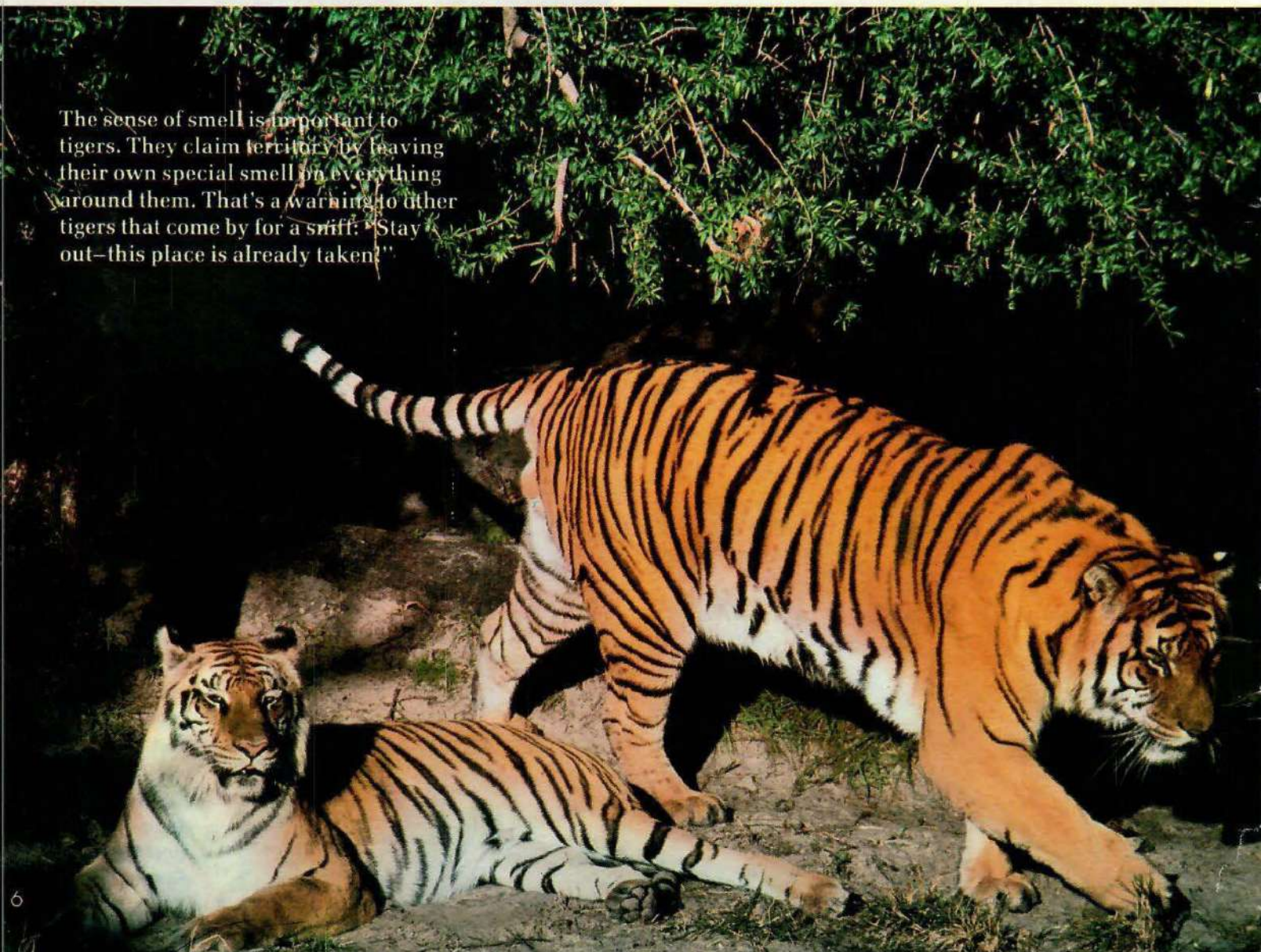
For animals, their sense of smell is also related to what they eat. Hunting animals, like dogs, wolves and lions, use their sensitive noses to track down their dinners. Even tiny animals like ants use smell as a guide to finding food.

In the animal world, smell also helps creatures to identify each other. Tigers put their individual scent on land that they claim as their own territory. When another tiger comes along and sniffs, it knows just which neighbor owns that spot. A lamb uses its sense of smell to find its mother among a flock of sheep. Smell even helps guinea pigs tell males from females.

## Taste

Your sense of taste comes from the thousands

The sense of smell is important to tigers. They claim territory by leaving their own special smell on everything around them. That's a warning to other tigers that come by for a sniff: "Stay out—this place is already taken!"







**Above:** This snake isn't trying to look fierce. A snake's flicking tongue brings bits of air into its mouth. The smell and taste of the air tells the snake what's around it.

of taste buds on your tongue. They tell you whether something tastes sweet, sour, salty or bitter. Your taste buds are more sensitive to bitter tastes than to sweet ones. And that's important. Since poisonous things are often bitter, your taste buds help you to stay out of trouble!

Animals don't always taste things with their mouths as you do. For example, flies taste with tiny hairs on their feet. They must step on their food in order to get interested in eating it. A shellfish called a mussel has tentacles around the edge of its shell for tasting.

Snakes have a special sense that is somewhere between smelling and tasting. They use a small hole in the roof of their mouths that is lined with sensitive cells. The reason a snake often flicks out its tongue is to collect air samples and bring them back to this hole. There it smells and tastes whatever is found nearby.

### Uncommon Senses

The fish is one of many animals that combines its senses in unusual ways. Fish can hear

in water even though they have no ears. A gas bladder in their bodies can pick up the vibrations that sounds make in water. So fish actually hear through their sense of touch!

Most amazing of all may be the animal senses that go beyond your usual five. Certain fish produce electrical currents. This electrifying sense helps them to find food in the water. Birds seem to have a magnetic sense that guides them when they migrate. The electrical sense and the magnetic one are special senses. They are different from seeing, hearing, smelling, touching or tasting as you know them.

Now that you've explored the world of animal senses, which animal do you think has the best senses of all? Think about the fact that a cat can smell a fish but not a rose. That's probably because a cat likes to eat fish but not roses. A cat's sense of smell isn't better or worse than a dog's or yours. It is just right for a cat's life.

And the same is true for all other animals—including you. Each one has senses best suited to its own needs. And your senses work just right for you. Makes good sense, doesn't it?

**Below:** Pigeons and some other birds have a special sense that helps them find their way. Homing pigeons are thought to use the position of the sun, and even the earth's magnetic field to navigate across the sky.

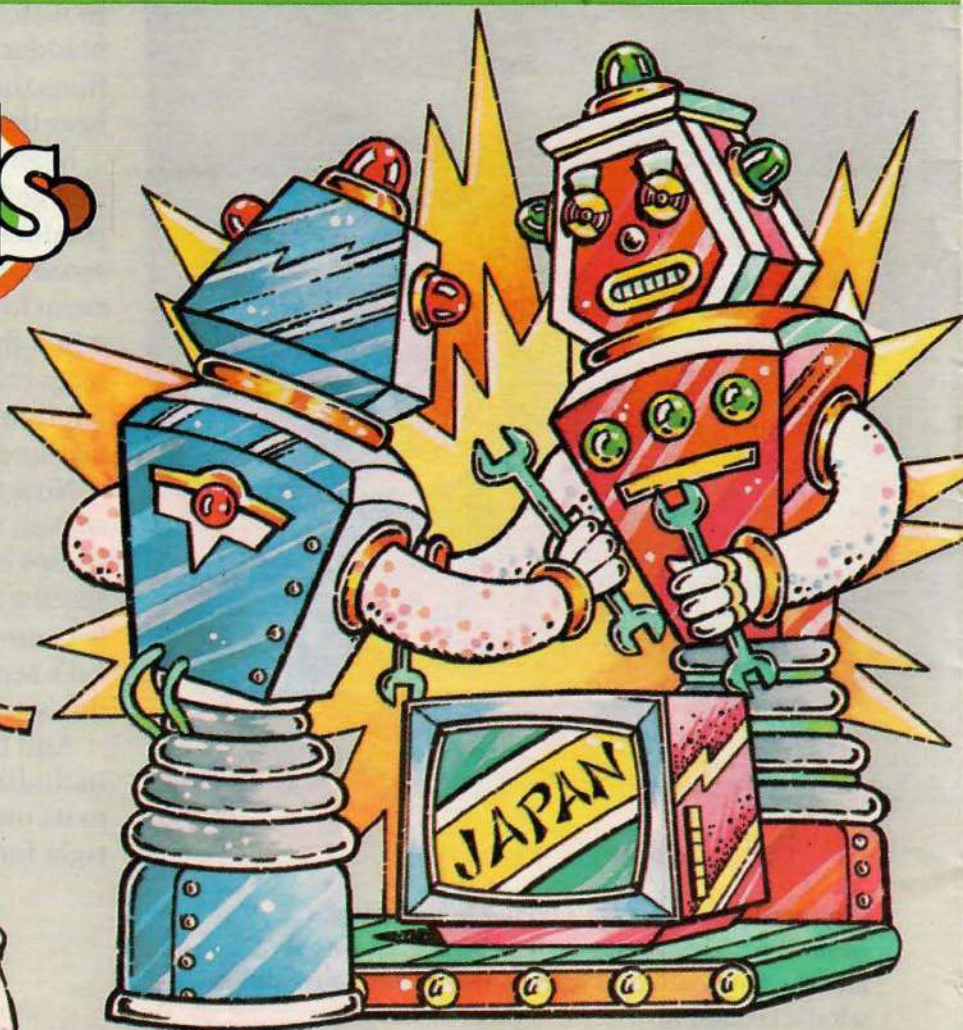




# Factoids



French fries are ordered in restaurants more often than any other dinner food.



There are more robots in Japan than in the rest of the world combined.



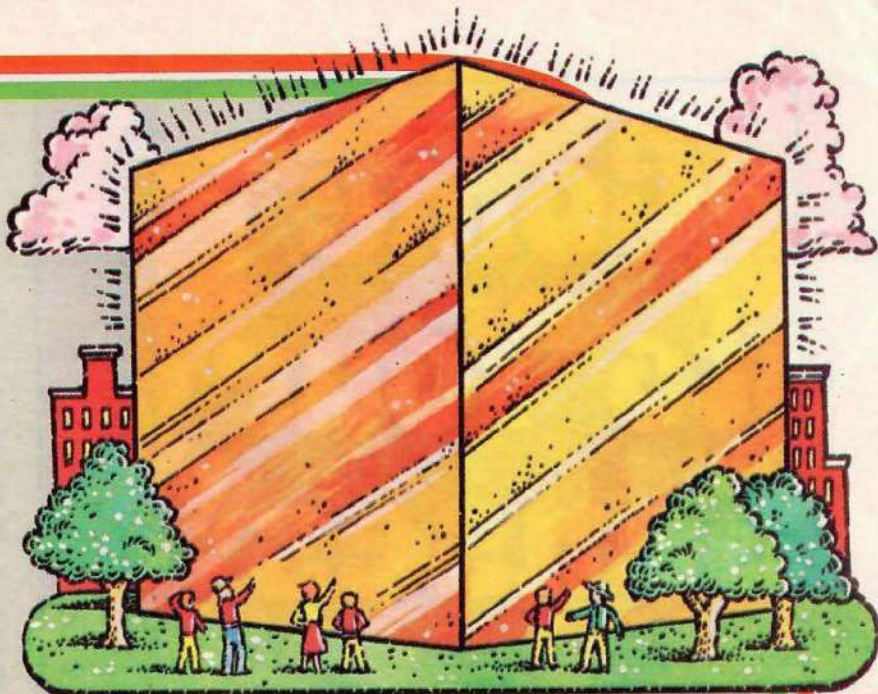
The smallest mammal is the etruscan shrew. It is about an inch long, including its tail.



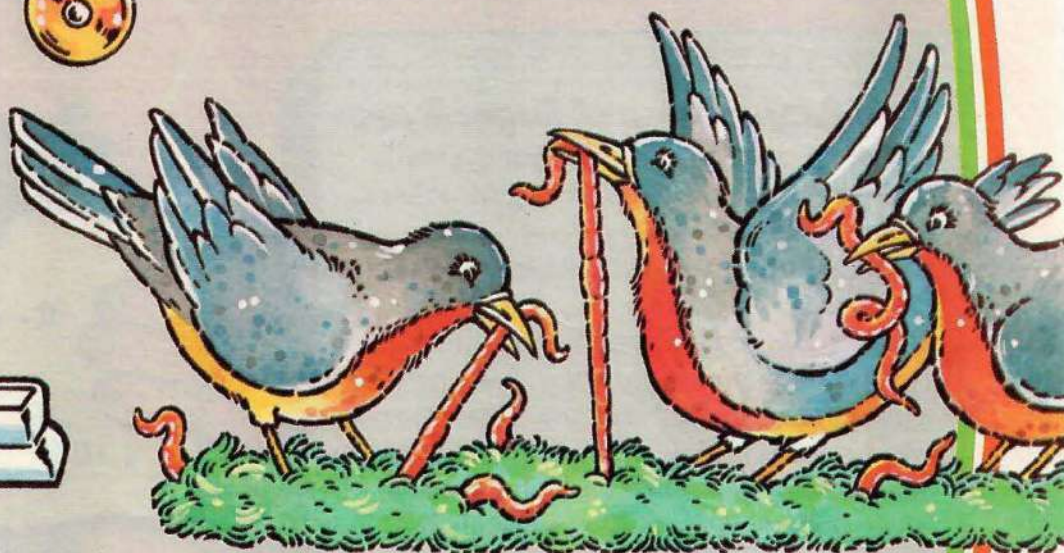




Your muscles make up about half your body weight.



If all the gold ever mined were packed into a cube, it would measure about 54 feet on each of its sides.



In an acre of land there can be as many as a million earthworms.

The distance between the wingtips of a 747 jet is greater than the distance of the famous first flight of the Wright Brothers.





# Come to Your Senses!

by Megan Srine and  
H. William Srine

Everyone has heard of the five senses. There are touch, taste, smell, sight and hearing. (Your common sense tells you that.) Sometimes your senses don't make any sense at all. This means you can fool your senses and have fun finding out about them, too. Try these activities on yourself and your friends. See if they don't make a lot of sense when you're done!

## The Adventures of Super-Eyes

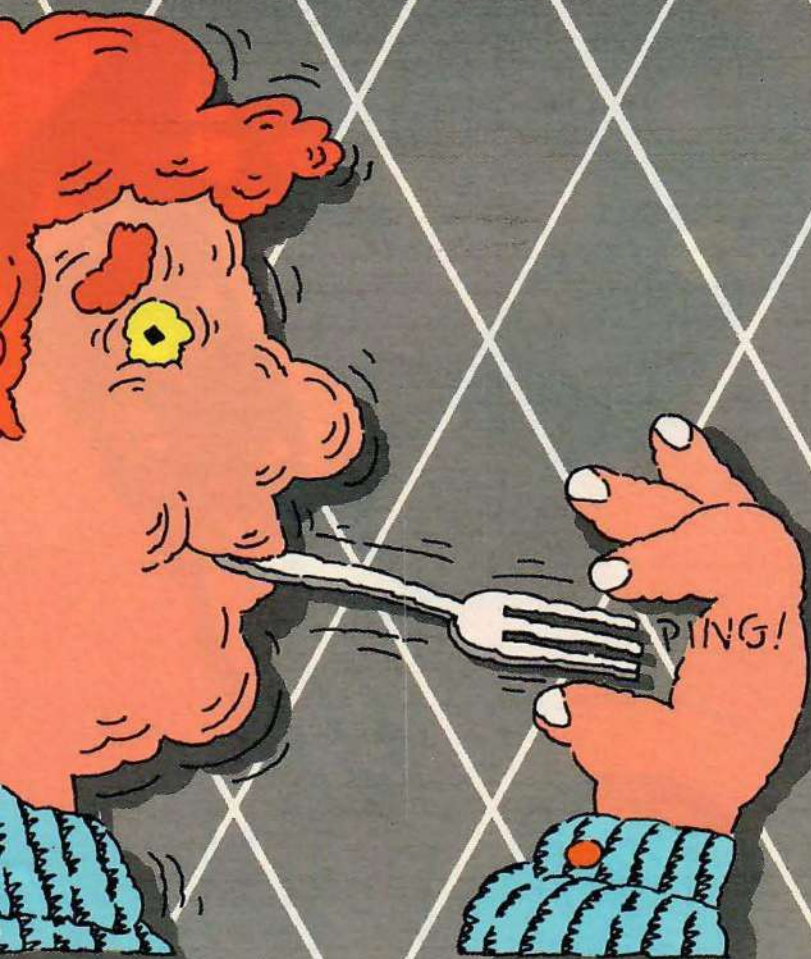
Sure, Superman can see through walls. But can you name the amazing superhero who can see through a peanut butter and jelly sandwich? Why it's Super-YOU of course!

Boldly hold up a peanut butter and jelly sandwich in your right hand, keeping it about one and a half feet (.45 m) in front of your right eye. Now, fearlessly look through a rolled-up paper tube with your left eye. Keep both eyes open. Slowly bring the sandwich toward you, sliding it along the side of the tube. As the sandwich comes nearer, you will see a hole move to the middle of the sandwich.

Is the hole world going nutty? No, what's happening is what always happens when you look at something. Your brain gets a picture from each eye. Then it puts the pictures together. Usually, the brain simply has to put together two pictures of the same thing—from slightly different angles. But this time, it puts together the picture of the sandwich from your right eye with the picture from the tube covering your left eye. The result? A peanut butter and jelly donut!







## Ping Time

Hey there, dinner eaters. Bored with brussels sprouts? Here's a way to put off eating them for a couple of minutes.

Hold the handle of your dinner fork between your lips, but keep your teeth apart! Pinch the outside prongs of the fork. Use your fingernails, so you hear a nice clear PING! (This may take some practice.) When you get a good ping, gently close your teeth on the fork. The sound should suddenly get louder.

Sound waves usually travel through the air to your ears. But not in this case. The fork sets your teeth and the bones in your head vibrating. The sound waves travel better along this path. So when they reach your ears, the ping sounds louder.

## Non Scents

How can a person work in a chocolate shop or on a sanitation truck or in a perfume factory and not go bonkers with the smells? Your sense of smell is sensitive. But it can become bored easily and turn itself off.

Get a bottle of perfume or something else with a strong smell. Put your nose right at the top of the bottle and sniff deeply five or six times. Keep breathing and smelling through your nose. Soon, you won't be able to smell the smell at all.

Your sense of smell is very adaptable. It quickly gets used to an odor. And when it does, it is no longer sensitive to the smell. If, however, you took the odor away and sniffed it a minute later, you would be able to smell it again.





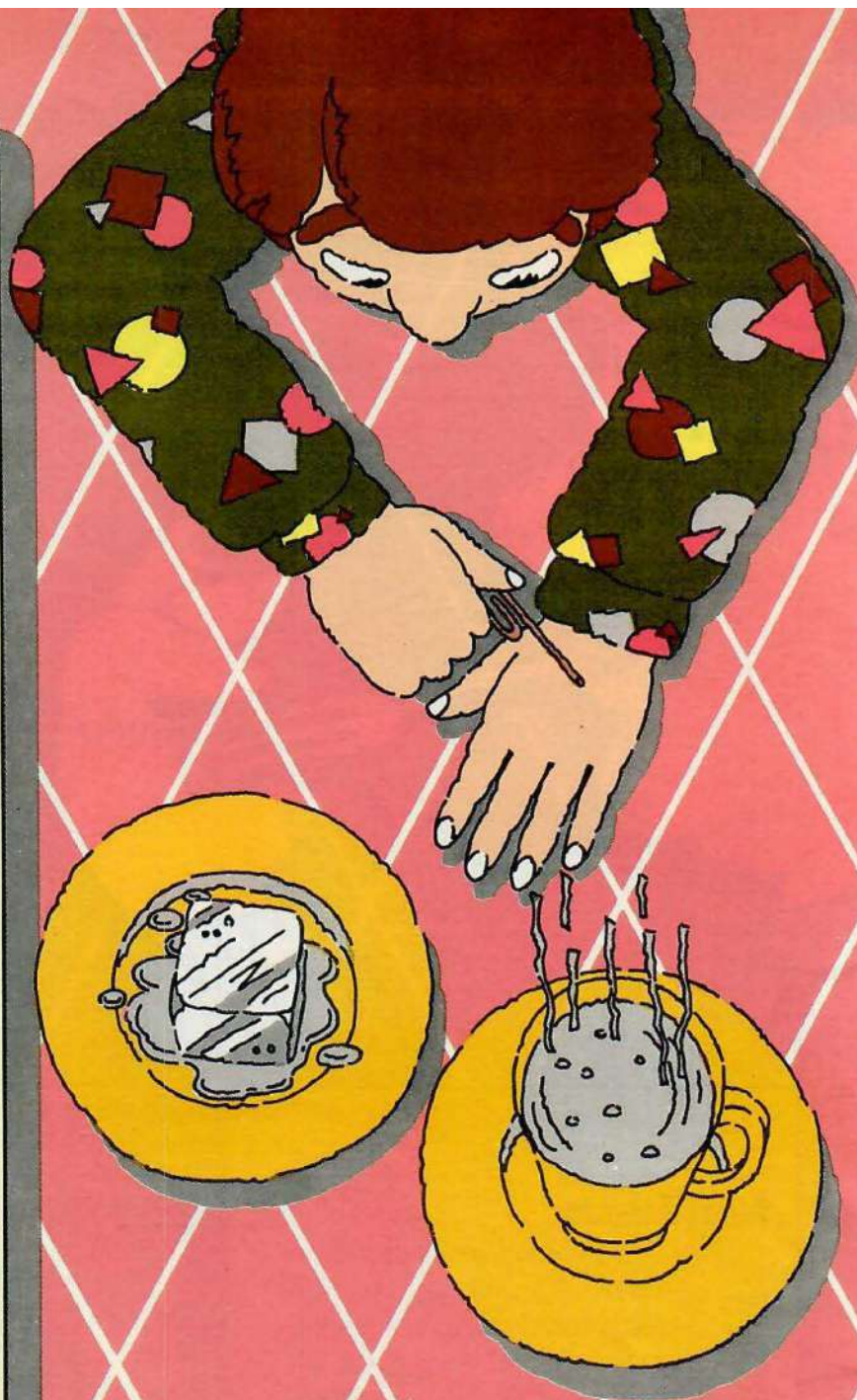
## A Touchy Subject

Your sense of touch is handy indeed. It's great for feeling a tiny ant crawling up your arm. It also warns you when your so-called friend drops an ice cube down your back!

Hot, cold and plain old touch are not the same. Some even work better than others. To prove this, get a paper clip, an ice cube and a cup of very hot tap water. Bend open the paper clip. Lay the prong on the ice cube for a few seconds. Then touch the cold point to the back of your hand. Do you feel cold—or do you simply feel pressure? Now move the paper clip over just a tiny bit and touch your hand again. This whole experiment should take place in a quarter of an inch (.62 cm) square area. After all, hot and cold sensors are teeny, tiny things!

Repeat the cold test 10 times in that tiny space. You'll notice that not every little part of your hand is sensitive to cold. Now place the clip in very hot water. Repeat the test.

You will feel the paper clip every time. But you will only feel the heat or cold sometimes. In your body, there are fewer heat sensors than regular sensors. There are even fewer cold sensors. But keep cool! There are enough of all three to get the job done!



## Tongue Twister

Stick out your tongue and pant heavily. Dog imitations? No, it's time to learn something about good taste. Pant until your tongue is very, very dry. When it is completely dry, touch a salty pretzel to your tongue. Leave it there for a few seconds. You shouldn't be able to taste it.

Now put your tongue back into your mouth. When your tongue is moist, try that pretzel again. This time you should have no trouble tasting it at all.

Your tongue is covered with taste buds. But to reach them, the chemicals in food must begin to dissolve in liquid. That's why mouth-watering saliva is so important. It's also why a dry tongue is only good for one thing—sticking out at people.



## Now Hear This!

You have heard that two hands are better than one. Well, it's true for ears, too. Blindfold yourself and have a seat. Have several silent friends sit around you. The only sound you should hear is the ticking of a clock that one friend is holding.

Quietly, your friends should pass the clock around. When they stop you must listen for the tick and point to where the clock is. Try this eight or nine times. It's simple, right? Now try again, keeping one ear tightly covered.

You will probably have less luck the second time around. One ear is enough to hear things. But it is not always enough to figure out exactly where a sound is coming from. You need two ears for that.

Sound travels through the air in invisible waves. The sound waves from a noise on your left reach your left ear a tiny bit sooner and sound a tiny bit louder. Your brain receives a little different message from each of your ears. By putting them together you figure out exactly where something is.



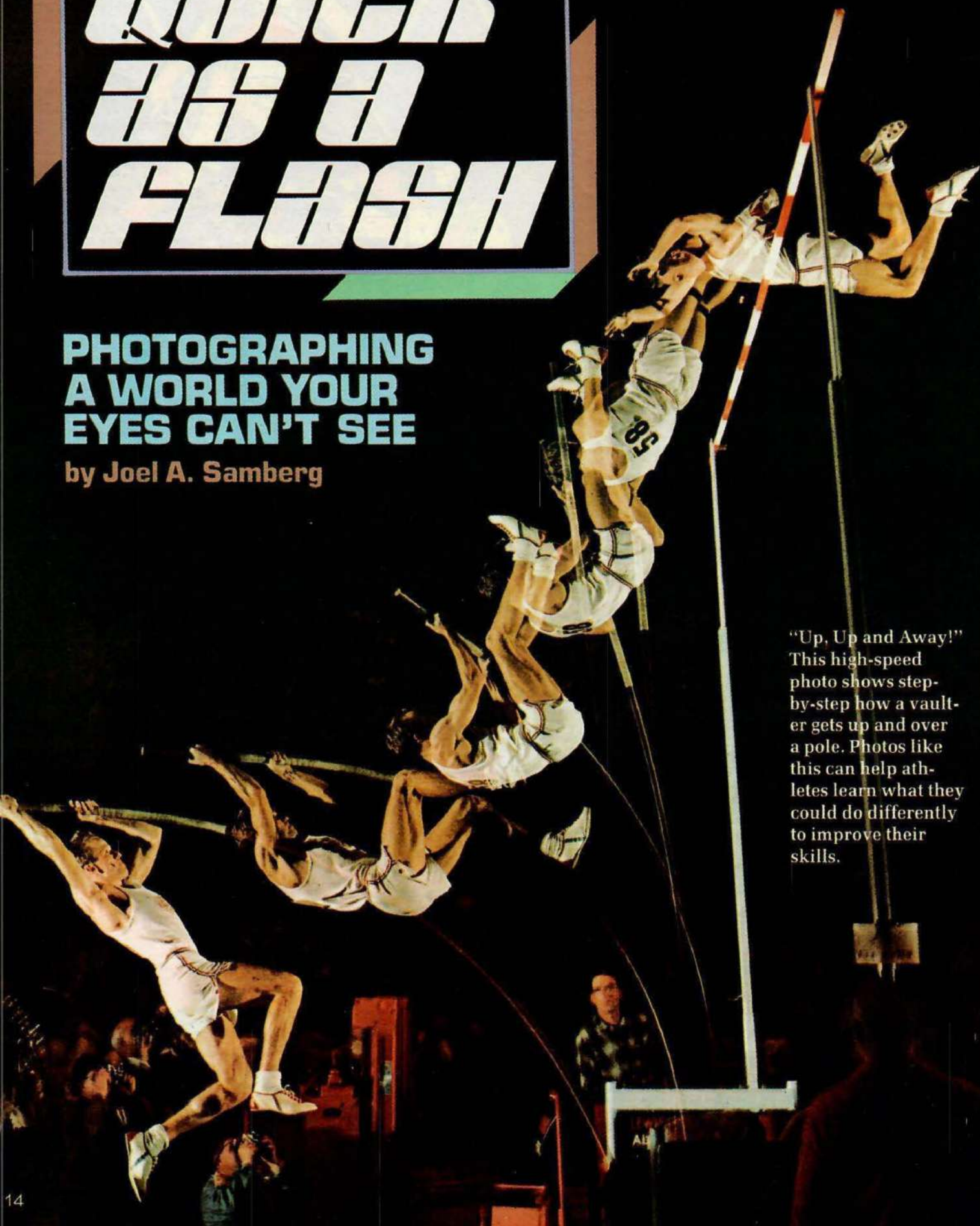


# QUICK AS A FLASH

## PHOTOGRAPHING A WORLD YOUR EYES CAN'T SEE

by Joel A. Samberg

"Up, Up and Away!"  
This high-speed  
photo shows step-  
by-step how a vault-  
er gets up and over  
a pole. Photos like  
this can help ath-  
letes learn what they  
could do differently  
to improve their  
skills.





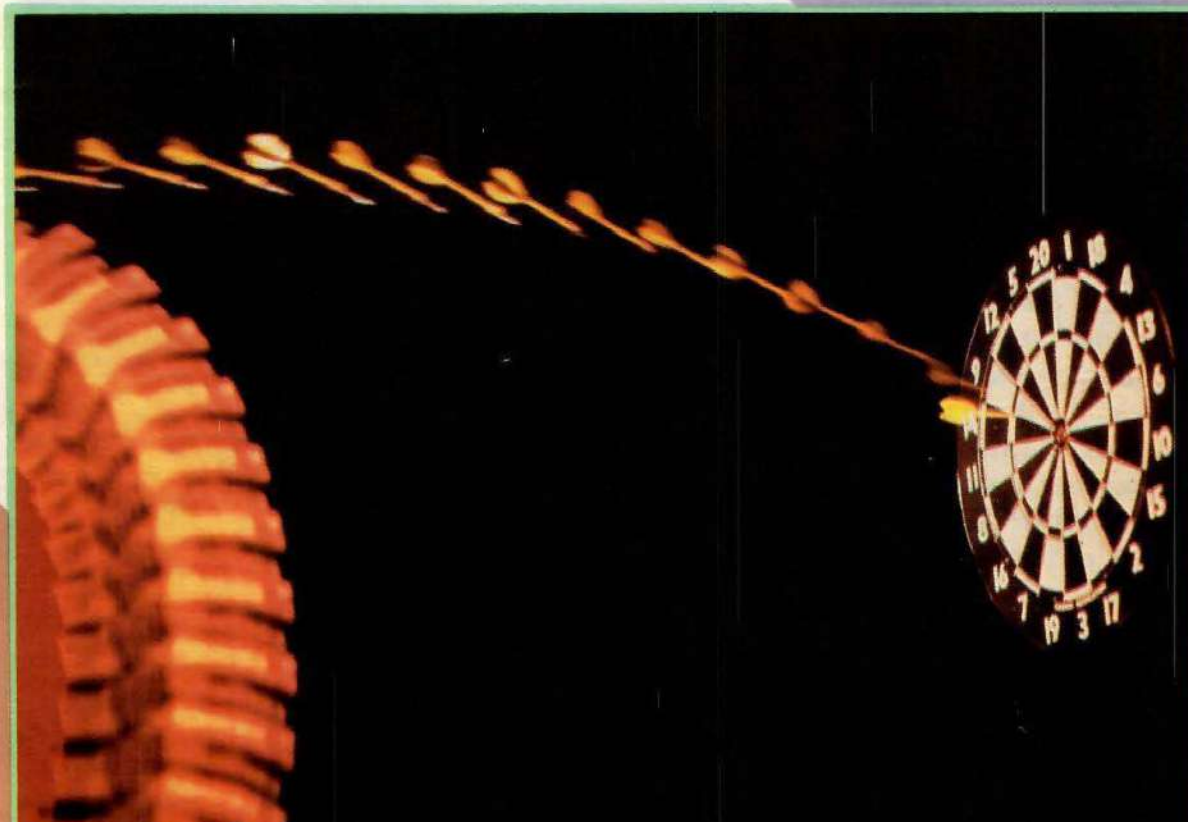
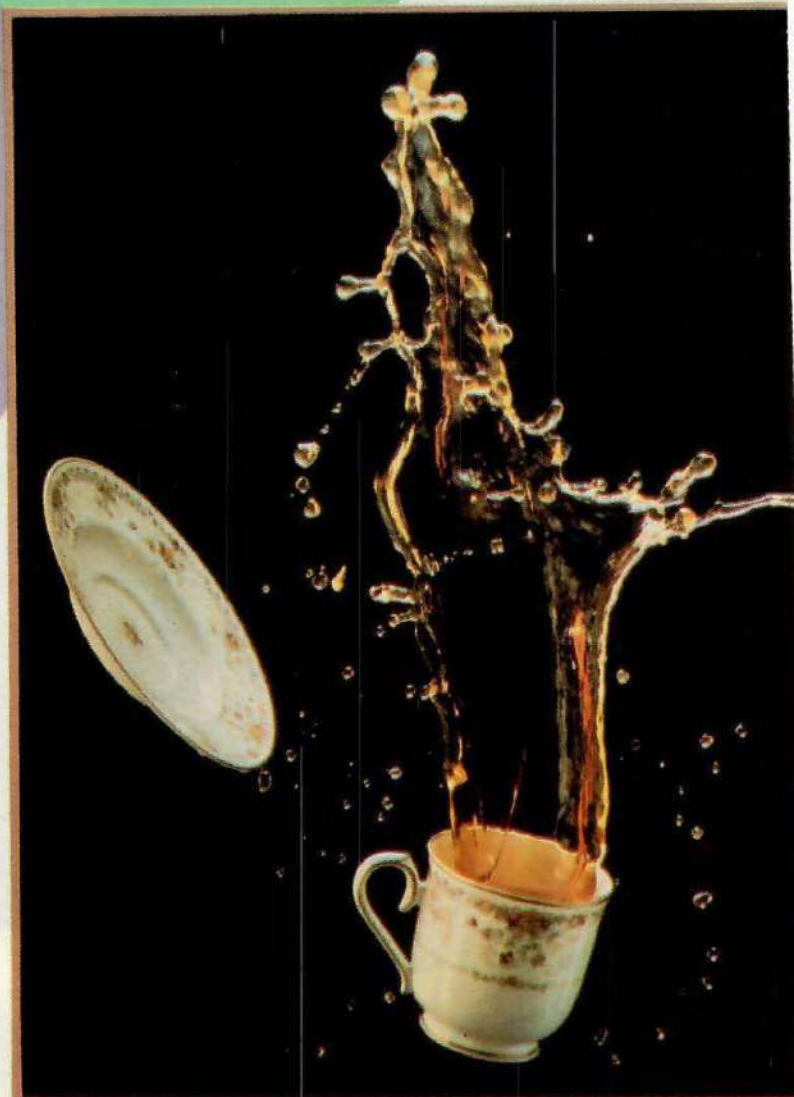
Do you remember the last time you saw a magician make a coin disappear? Did he really make the coin vanish? Or did he move his hands so fast that you just didn't see where he hid it? That's one case of the hands being quicker than the eye. But if you could take a picture of the magician at the exact moment when he hid the coin, you would see how he did the trick.

Taking a picture of a magician's hands is not as simple as it sounds. Most cameras can't catch such quick movements. But with special equipment, people can stop the action of things that happen so quickly you can't see them with your own eyes. You can see a bird flapping its wings. Or a baseball bat striking a ball. Or lightning zig-zagging across the sky. This kind of picture-taking is called *high-speed photography*.

### A Blink of the Eye

The most common way to take high-speed photographs is with a regular camera and a special light. It's a kind of *strobe* light that was invented years ago by Dr. Harold Edgerton. Strobe lights make very bright and quick bursts of light. The light helps to capture a very brief moment of something that happens very fast. It shines as bright as thousands of light bulbs and flashes quicker than a blink of your eye.

You can see for yourself how a strobe light works. First, go into a dark room with a friend. ➡➡

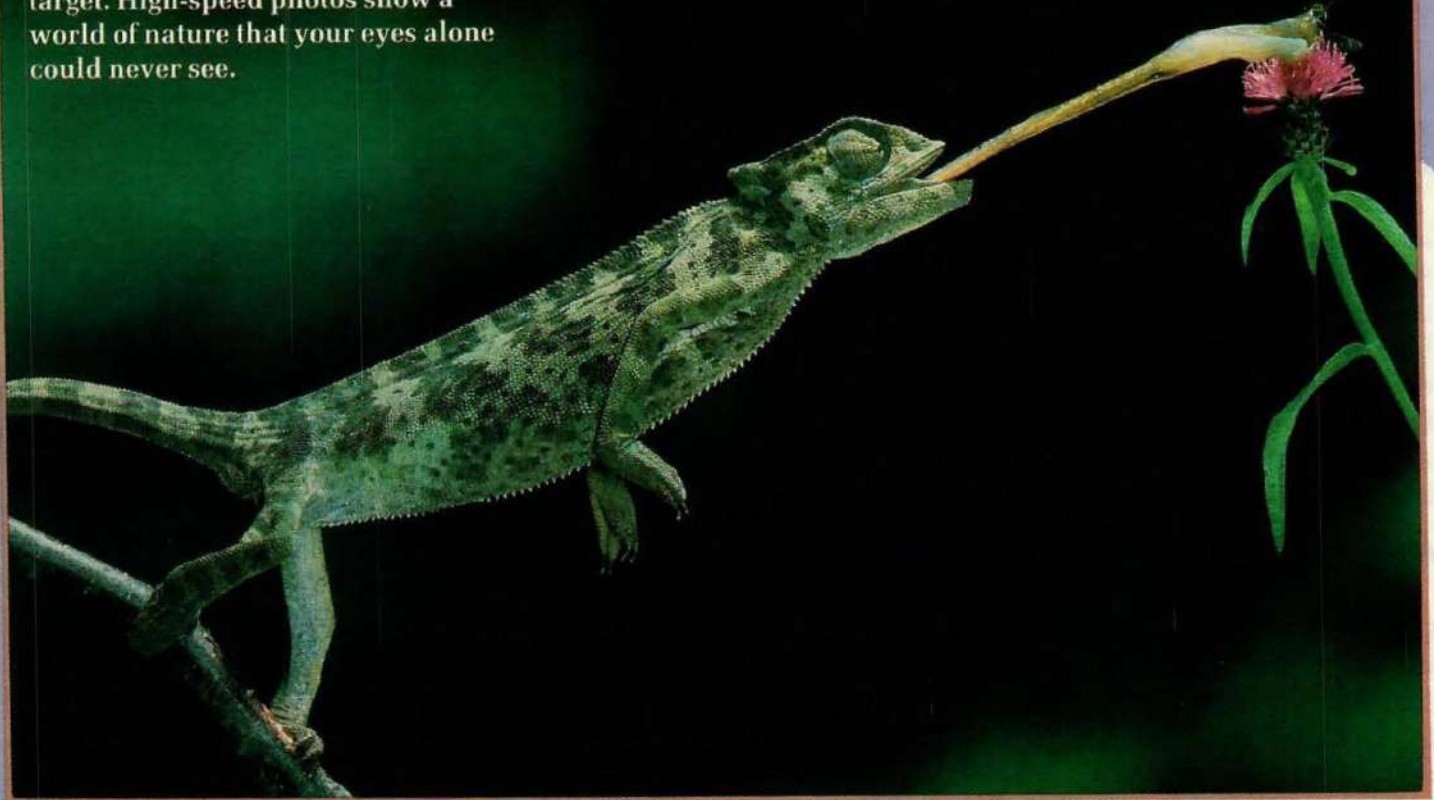


**Above:** "Whoops!" High-speed photography gives you the chance to see a mess before it happens. You can see that the tea poured out of this cup long before it hit the floor.

**Left: "Bull's-eye!"** Several strobe flashes helped the camera record the dart's flight. Notice how the dart drops into the perfect spot an instant before it hits the target.



**"Gotcha!"** In a split second, a chameleon unrolls its long tongue and zaps it out to collect some food. In this case, an unlucky bee was the target. High-speed photos show a world of nature that your eyes alone could never see.



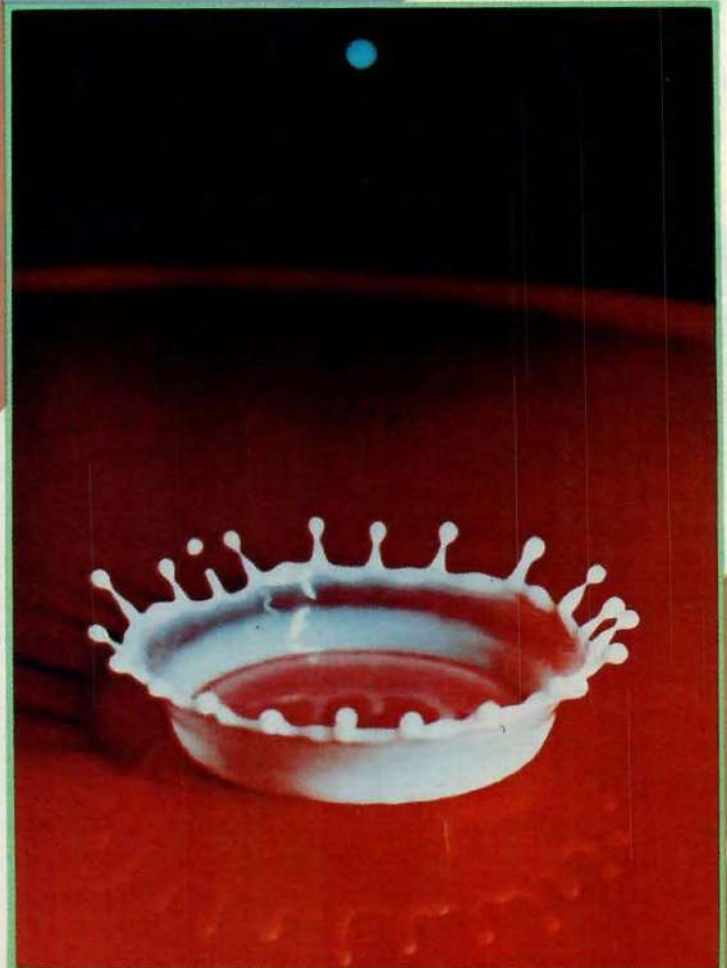
**Right: "Splash!"** You've seen a crown of gold. But have you ever seen a crown of milk? Many beautiful patterns appear when you look at the world through high-speed photos.

Then tell your friend to jump up and down and move her arms. Meanwhile, you turn the light switch on and off very quickly. Every time the lights go on, you will see your friend "frozen." If you took a picture each time the lights were on, the pictures would show your friend completely still. This type of high-speed photography is called *stop-action*.

Dr. Edgerton has used the same kind of method to stop the action of a hummingbird's wings. The tiny bird's wings flap about 60 times each second. Since the human eye can't see things that happen so fast, the hummingbird's wings seem to be a blur. When Dr. Edgerton uses a strobe light, his photos seem to stop the action of the bird's wings. They look frozen, the same way your jumping friend looked frozen when you flicked the light.

### **Your Eye Vs. the Camera**

When your eyes see something, the light from the object focuses on a lining inside your eye-ball—your *retina*. The retina contains special





cells that react to light. When the light from the object touches the retina, the cells send an image to your brain of what you're seeing.

But your eyes can only see things that happen about 10 times a second. Your retina can't keep up with anything that happens faster. That's why you can't see a hummingbird's wings flapping. You see the movements as just a blur.

The same fuzzy problem exists when people

want to photograph very quick movements. A regular camera's shutter can't work so fast. To stop the action, the strobe light is used. The quick, flashing light exposes things for an instant.

So the camera can capture the frozen image of a hummingbird's wings. Or a tennis ball changing shape as a racket hits it. As you can see, with high-speed photography, stopping the action is a real snap!



**Left:** "Good Catch, Good Catch..." Can you count how many pins this man is juggling? It looks as if he's juggling about 20, but there are only a few. This is one case of a high-speed photo making a hard thing to do appear even harder.



# List of the Month

## Circus of Illusions

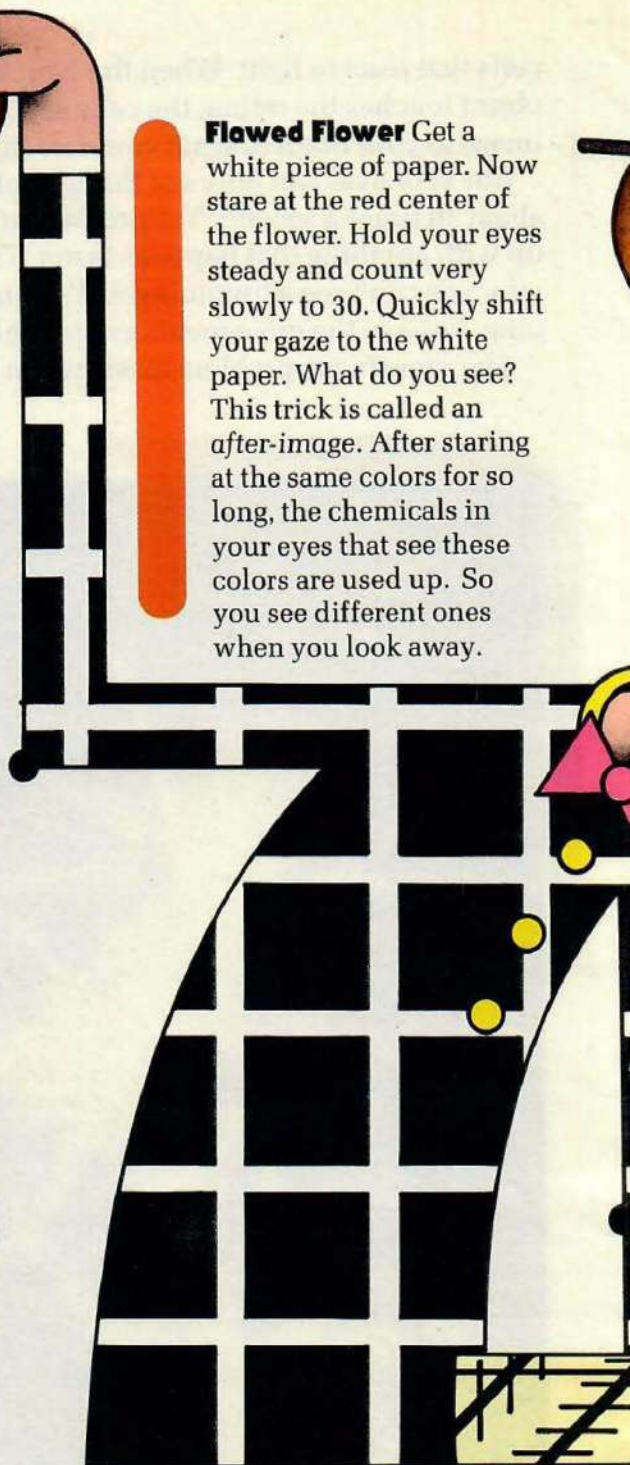
by Rebecca Herman

Your eyes can fool you. What you think is there really isn't. That's an *optical illusion*. Take a look.



**High and Wide** Which is longer—the height of the magician's hat or the width of its brim? Actually, this is a trick question. But you can see the answer. Pull out your ruler and measure. See? Both the height and the brim are the same length. You think the height is longer because it goes up and down. Your eyes just can't measure as well as your ruler can.

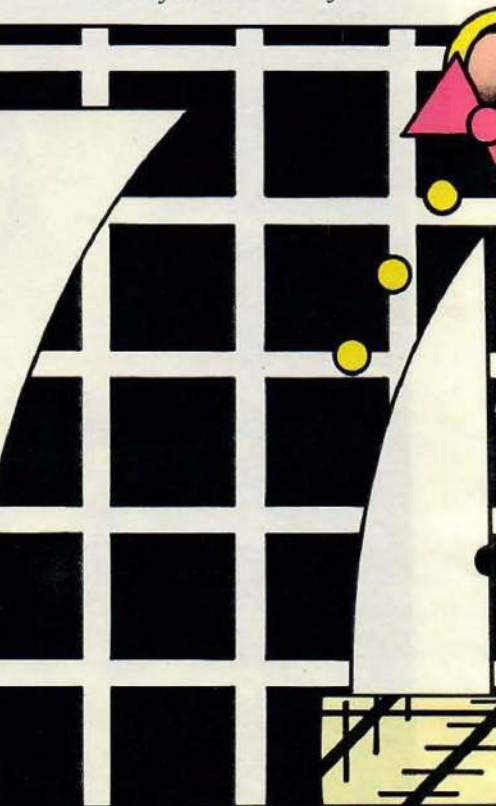
**Flawed Flower** Get a white piece of paper. Now stare at the red center of the flower. Hold your eyes steady and count very slowly to 30. Quickly shift your gaze to the white paper. What do you see? This trick is called an *after-image*. After staring at the same colors for so long, the chemicals in your eyes that see these colors are used up. So you see different ones when you look away.



**Look Again** What has magically appeared? Is it a rabbit or a duck? Maybe you see a different animal. It's up to you. From one moment to the next, the image can change. It's possible to play the same kind of game with the cracks on a wall or the pattern of a cloud. Let your imagination run wild. Soon all sorts of things will be popping up!



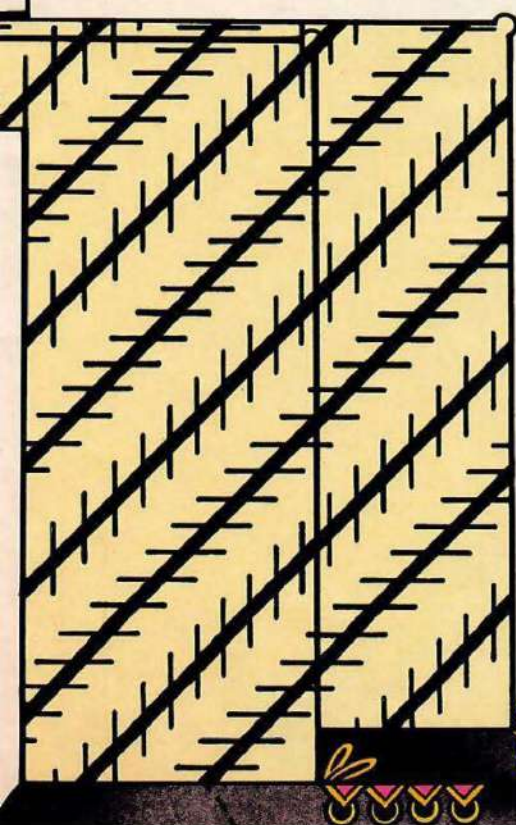
**Fancy Pants** It looks like whoever made the tall man's pants can't sew straight. But by now you should be getting the idea. Use your ruler to see that the long lines are all going in the same direction. It's the short lines that fool you. Your eyes follow them, first one way and then another. You think you're seeing cock-eyed. But everything is really lined up straight.







**Ghost Dots** Those gray dots at the intersections aren't really there. You see them, though, don't you? When white is next to black, it seems darker than when it is next to white. That's why your eyes see only white between the black squares. But at the intersections, where the white bars meet, there is less contrast. So you see gray.

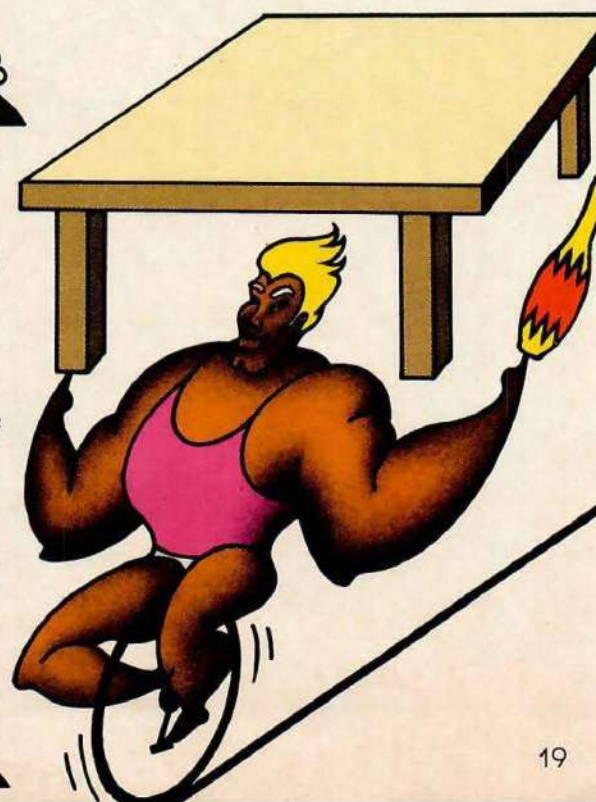


**Have a Ball** Look at the two center balls. Does one look bigger than the other? The answer isn't what you think you see. Measure the center balls and you'll find that both are the same size. The outer balls trick your eyes. The big ones make the ball in the center look smaller. And you get the opposite effect when you look at the group of small balls.



**Seeing Double?** Do you notice anything wrong with the clown's sign? Nothing, you say? Then read it again—slowly. Aha! There are two "the"s. Most people don't see the error at first glance. Usually, when you see a familiar sentence, you don't read it one word at a time. You recognize what you're seeing. So you read the sentence in one shot.

**Cheap Trick** Bet you think that a nickel could fit on this table without touching any lines. Guess again! The table sure looks big enough. But put a nickel on it and see for yourself. It doesn't work. The nickel touches the sides of the table. The trick is in the angles of the table top. They make you think the table has depth that really isn't there.





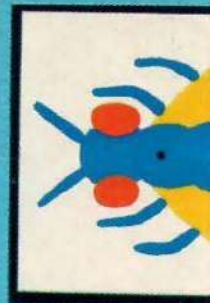
# WILD

There's a zoo full of animals here.  
All you have to do is trick your  
eyes into seeing them.



1. Put your nose about two inches from the X and you'll see the butterfly land on the flower. Your brain combines the two images from both eyes.

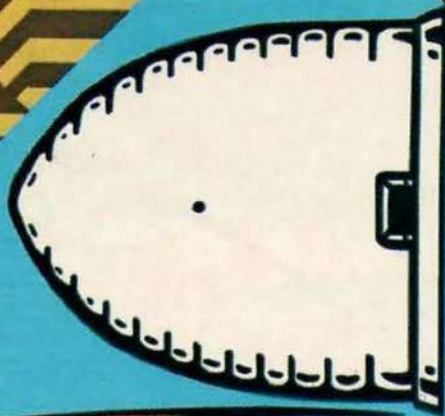
4. Up close, this looks like a bunch of squares. But look at it from a distance and see what gallops into view.







5. Stare at the black dot on the bee dot on the hive below.



6. Hold this flat, in front of your eyes. Try different angles until you see what's what.



Are you having trouble with some tricks? For some help, turn to page 37.

2. The zebras are there, but only by a trick of your eyes. The shifting of the lines encloses the shape of the animals.



Place a mirror, facing left, on the dotted line. What do you see? Doing the same, face the mirror in the other direction.





# Any Questions?

by Gail Jarrow

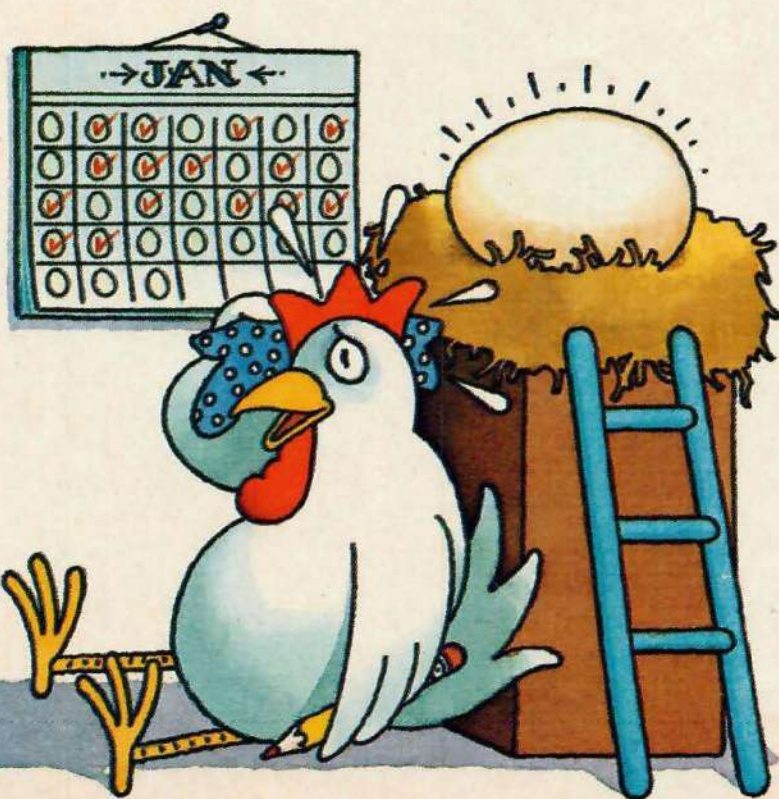
**How is paper made?** When you spend too much, your family tells you that money doesn't grow on trees. Actually, money can come from trees. And it has, ever since it was first made in China 2,000 years ago.

Money and other kinds of paper come from plant fibers called *cellulose*. To turn trees into cellulose, logs are ground up into wood chips. Then the wood gets cooked with special chemicals. Water is added to the mixture next.

Finally, a soggy clump of fibers is spread over a screen with many tiny holes. As the fibers dry, they stick together and form a flat sheet. Giant rollers smooth and press the sheet until it is paper thin.

For paper that is stronger or more absorbent, extra steps are added. Depending on what they are used for, thousands of different kinds of paper are made. Just think how many you use each day. Books, food containers, tissues. Paper is everywhere!

Question sent in by Abigail Hoffman, Watsonville, CA.



**How do hens lay eggs?** Can you believe that eggs are made from the inside out? It's true. That's how the hen gets everything into the shell!

Inside a hen's body, the yellow yolk is made first. If a chick were to grow in the egg, the yolk would be its food. Next, the yolk slides into a special tube inside the hen. There, a clear liquid egg white is added. Farther down the tube, two thin pieces of skin called membranes wrap around the white. A hard shell completes the package.

When an egg is finished, a hen goes to her nesting place. Her muscles gently push the egg down the tube. From an opening near her tail feathers, the egg leaves the hen's body—usually small end first.

It takes a hen a little over a day to make and lay an egg. As soon as that egg is laid, she starts making another. But every few days, she takes a day off to rest. Even so, all that egg laying adds up. In fact, a hen can lay about 250 eggs a year!

Question sent in by Erin Glasser, Dayton, OH.



Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

**Any Questions?**  
**3-2-1 CONTACT**  
**P.O. Box 599**  
**Ridgefield, NJ 07657**

## How does wax get in your ears?

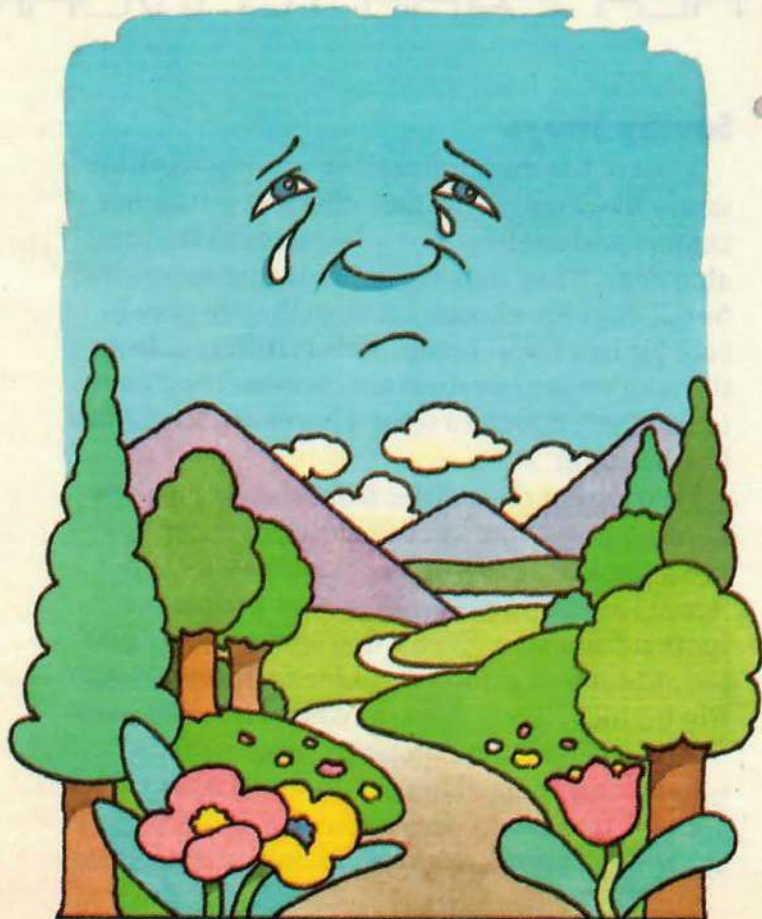
Just because there's gooey wax in your ears doesn't mean they're dirty. Just the opposite! Special glands make this soft, greasy stuff to keep dirt out.

You find wax in your ear canal, the short tunnel that connects your outer ear with other parts of your ear deep inside your head. The lining of your ear canal has glands that make the wax.

Sometimes dirt or even tiny insects get into your ears. That's when the sticky wax goes to work. It traps those trespassers before they get too close to your delicate inner ear.

Of course, extra wax sometimes builds up on your outer ear. Then it's time to wash! But do your ears a favor. Don't try to clean the wax out of your ear canal. You might push it in instead. That wax may seem yucky, but it really gives your ears a helping hand.

*Question sent in by Jonny Dietrich, Eatonsville, MD.*



**Why is the sky blue?** Up in the sky you can see many different colors. But blue is the one you see most often.

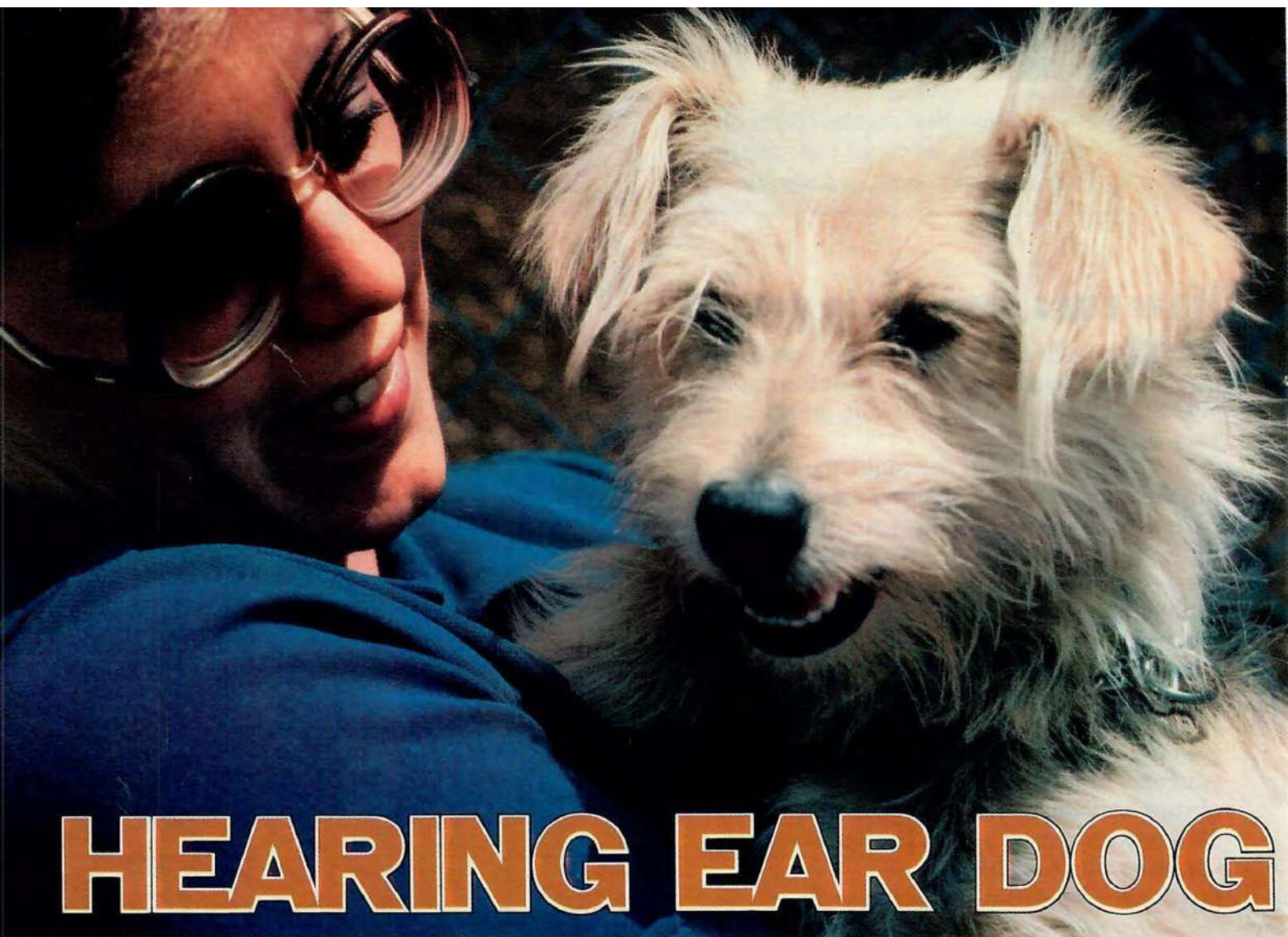
Blue skies start with sunlight, which is made of many colors. Hold a glass prism in front of a sunny window and you'll see all the colors of the rainbow. There is something like a prism up in the sky. It is tiny particles of air. They scatter all the colors of sunlight across the sky. But the light rays of each color are slightly different. So some colors get scattered more than others. The color that's scattered most is blue.

The sky looks blue only if the air is dry and clean, however. Sometimes the air is full of water droplets or dust. These particles scatter all the colors equally. So the sky ends up looking gray.

If you could rocket up past the layers of air around earth, you would see black. There's almost no air, water or dust in space to scatter sunlight. So, except for the sun and stars, space is dark as ink.

*Question sent in by Michael Conner, Arlington, TX.*





# HEARING EAR DOG

## HOW PENNY PUTS HER EARS TO WORK

by Susan Meyers

You've heard of ears that wiggle. But have you ever heard of ears that bark? Many deaf people now have furry, barking, tail-wagging "ears." They are the lucky owners of hearing ear dogs.

For years, specially trained guide dogs have been helping blind people see. Now, dogs are also being trained to help deaf people hear. One of the most successful schools for hearing ear dogs is run by the Society for Prevention of Cruelty to Animals (SPCA) in San Francisco, California. That's where a bright-eyed little pup named Penny got her start.

Penny was a stray who was brought to the animal shelter at the San Francisco SPCA. She was hungry and dirty. Workers at the shelter fed her and gave her a bath. When no one came to claim her, the shelter put her up for adoption.

Penny was alert and friendly. She would have made a good pet. But Linda Gunn, a trainer for the Hearing Ear Dog Program, thought that Penny could be a good hearing ear dog.

### **Saving Strays**

Most of the dogs trained for hearing work are strays like Penny. Trainers check dog-training centers and shelters every few days to find suitable dogs. They look for animals that seem alert. Small dogs are chosen because they're easy to care for in a small home. This is different from the way seeing eye dogs are chosen. They have to be large enough to wear a harness and guide a blind person.

Hearing ear dogs differ from seeing eye dogs in other ways, too. Many hearing ear dogs are mixed breeds. But purebred animals are preferred for seeing eye work so that people can predict their size. Even a dog's personality matters. Calmness is important for seeing eye dogs. But bouncy, lively dogs do well at hearing work.

When Linda met Penny, the dog sniffed eagerly and wagged her tail. A medical exam showed that Penny was about a year old—a good age to start training. She was healthy. Her sense



of hearing was excellent.

Dogs in general have good hearing. A dog can hear a noise 250 yards (229 m) away that most people can't hear beyond 25 yards (23 m). But some dogs hear better than others. It was important for Penny to hear very well. Soon she was going to learn to hear for two.

### **Penny Goes to School**

The first step in training a hearing ear dog is basic obedience lessons. On command, dogs must learn to sit and lie down, stay and come when called. They must also learn to follow hand signals because some deaf people have trouble speaking. Penny took to her lessons quickly. Soon she was ready to learn the special skills that would make her a hearing ear dog.

The training takes about four months. In the San Francisco SPCA, dogs are trained in a homelike setting. An entire apartment has been set up. There is even a cat on hand to help the dogs get used to household pets.

Penny's first lesson was waking her trainer when an alarm clock rang. Linda lay on the bed. She pushed a button that set off the clock. Penny came running. She jumped on the bed. Linda praised her and gave her a treat to eat. ➡



**Above:** Many of the dogs in the hearing ear dog program were once strays. Linda found Penny at an animal shelter in San Francisco. **Left:** Obedience lessons are the first step in hearing ear dog training. Here Penny is learning to follow Linda's command to sit.





**Left:** Many deaf people use hand signals because they have trouble speaking. So hearing ear dogs like Penny are taught hand sign language.

**Below:** Penny's training center looks like a real house. There Linda can teach her to recognize common sounds, such as a ringing telephone. When she hears the phone, Penny runs to it to tell Linda it is ringing.

Linda repeated this lesson until Penny learned to jump on the bed whenever the alarm rang. Sometimes Linda pretended to be sleeping. She made Penny work to wake her up. Then she gave the dog some food as a reward.

Penny also learned to tell Linda when the doorbell rang. She would run to the door, then to Linda and back to the door. She kept doing it until her trainer got up and answered the door.

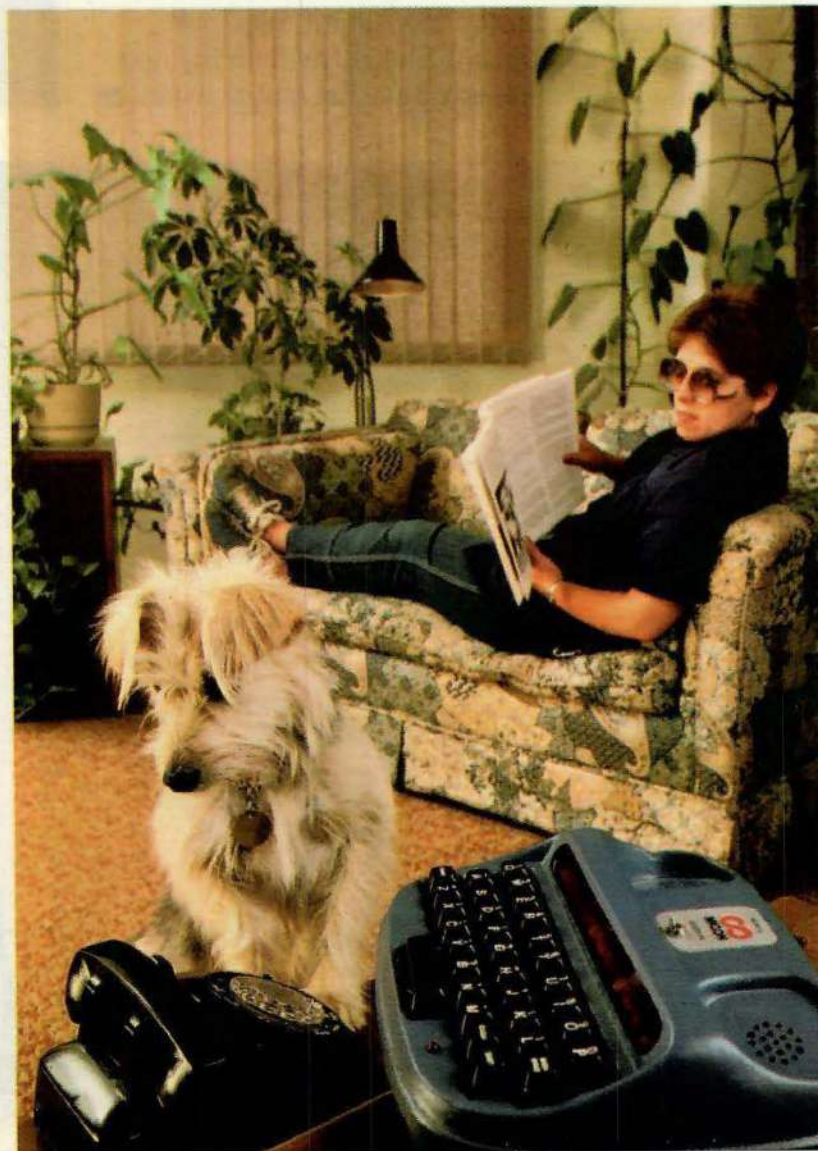
Other sounds that Penny learned to answer were an oven timer going off, a baby crying and a telephone ringing. Although completely deaf people can't use regular telephones, those with some hearing can use special phones that make sounds louder. There are also phones with type-writer attachments that deaf people can use to communicate.

Everyone in the program was pleased with Penny's progress. She was one of the best dogs they had ever trained. She liked people and she liked to work. Soon, it would be time to match her with a new owner.

### **A Surprise Ending**

People who want hearing ear dogs apply to the SPCA. But there are always more people than dogs. The waiting list usually has 30 or 40 names on it. When a dog finishes its training, it goes to the first person on the list.

Training the new owner is important, too. The







**Left:** Hearing ear dogs also learn to wake their owners when an alarm clock rings. Penny has practiced this many times with Linda.

**Below:** After they are trained, hearing ear dogs are given to deaf people. But not Penny. She lives at the SPCA and helps raise money to train more dogs.

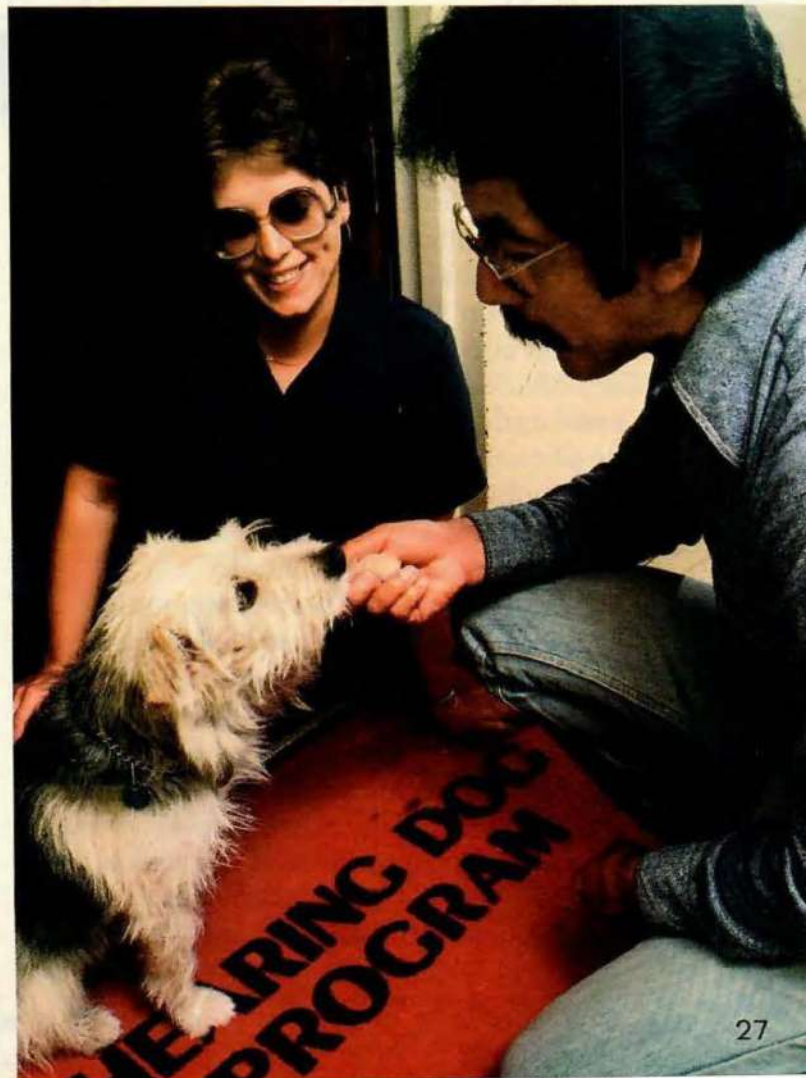
owner must learn what to expect of the dog. He must learn how to keep up the dog's training. If not, the dog can forget all it has learned.

When a new owner takes a dog, he keeps in touch with the dog's trainer. If problems arise, the trainer helps solve them. Linda hears many success stories. Some dogs have saved lives by alerting their owners to fires or gas leaks.

At the San Francisco SPCA, dogs are given free to deaf people. But the cost is over \$2,500 to train each dog. The SPCA raises that money.

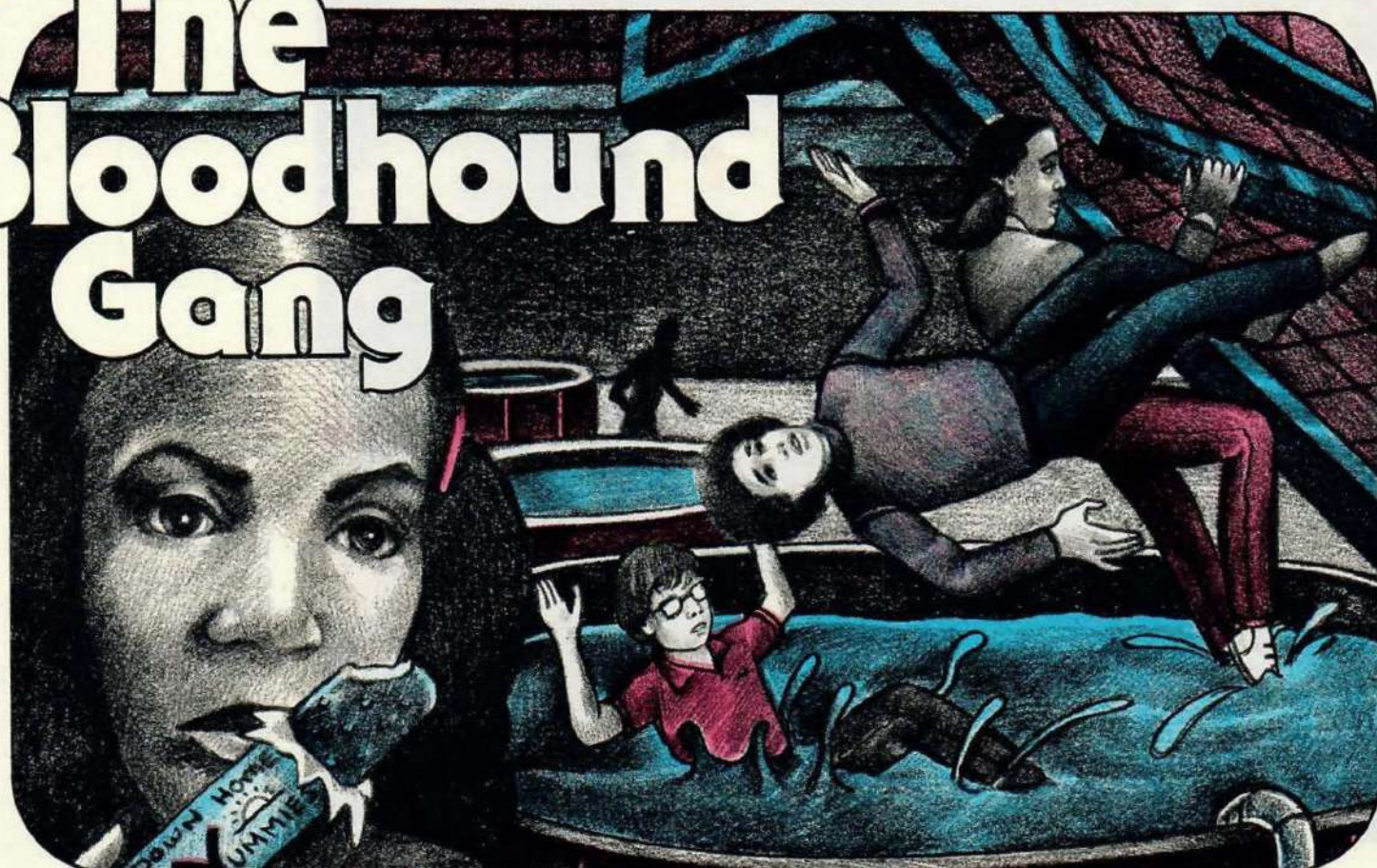
As Penny finished her training, Linda and others in the program realized she was special. She was such an eager worker that everyone fell in love with her. They thought, why not keep her at the SPCA as a demonstration dog?

Now Penny's full-time home is at the SPCA. She greets reporters at the door and lets photographers take her picture. She goes to community meetings to show her skills. So even though Penny didn't go to live with a deaf person as most hearing ear dogs do, she has actually helped many deaf people. Penny helped the SPCA raise enough money to train many more dogs. She's become famous for spreading the word about the Hearing Ear Dog Program. Not a bad end for a hungry, dirty, little stray pup!





# The Bloodhound Gang



## The Case of the Private Nose

Part One

by Bill McCoy

Vikki and Ricardo opened the door of the Bloodhound Detective Agency to hear a thunderous "Ah-CHOO!" There was Skip, blowing his nose and holding the phone. "It's Mr. Bloodhound. Ah-choo!"

"Yes, Mr. Bloodhound." Vikki listened, then got a pad and pencil to make notes. She hung up the phone. "We have an undercover job—touring the Conglom Company plant as science students."

"Great!" said Skip. "Ah-choo!"

"The only undercover work you should do is home in bed—shaking that cold," Vikki said as they headed down to get the bus.

The bus pulled up to a factory with a huge sign. "CONGLOM CO.," Ricardo read. "MAKERS OF NEW DOWN-HOME YUMMIES."

Vikki said, "We're meeting Simon C. Leazy, vice-president in charge of sugary snacks."

When they got to Leazy's office, his secretary said, "You'll have to wait. Mr. Leazy is on the

phone and someone else wants to see him."

A woman in a lab coat stood up. "I won't be long. He's giving me a yes or no answer."

Suddenly, they heard a voice thunder through the office door. "Get this, and get it straight. Those workers can go to our plant in Alaska, or they're fired. We don't need box packers here anymore." They all heard the phone slam.

"My turn, I guess." The woman opened the door.

Before she was even in the office, the voice roared, "Parker! What do you want?"

She answered right back. "I want a raise. You promised me one if I came up with the 'down home' taste for your Yummies, Leazy."

"We're having problems—"

"Look. Do I get a raise—yes or no?"

"NO!"

"Then I quit." The woman strode out. "I'll be gone by the end of the day." She looked at the Gang. "Wasn't that quick?" She walked away.



"I get the feeling this Mr. Leazy is a real popular guy," Ricardo whispered.

They entered the office. Behind a big desk sat a short, balding man with a sour expression. His jaw jutted out when he saw the Gang. "Now what?"

Vikki shut the door. "We're from the Bloodhound Detective Agency," she said.

## The Yummies Aren't Yummy

"The president of the company told me you were coming." He frowned. "In fact, if she hadn't brought you detectives in, I'd tell you to keep your noses out of this."

"What's the problem?" Ricardo asked.

"Down-Home Yummies!" Leazy said. "I dreamed up a great new snack, but somebody's ruining it!" Leazy frowned. "I have enemies. Yummies made me a vice-president. Lots of people got jealous."

"Like that lady who just left?" Vikki asked.

"That was Rose Parker from our lab. She helped come up with the flavor for Yummies."

"She sounded pretty angry," Vikki went on.

"So what? Nobody pushes Simon Leazy around." He pushed a button on his desk. "Call Rip Offenback." He stood and opened the door. "You'll meet him outside...."

A tall, heavy man charged into the office. His round face was red. "Won't answer my letters or telephone calls, eh? Well, you can't ignore me!"

"Who the heck are you?" Leazy said.

"J. Pierpont Grell!" The big man thumped his chest. "President of G.A.G., the Group Against Goo. We want you to stop making sugary snacks—especially those Yummies. They're very bad—"

"Get out of my office!" Leazy yelled. "I've had enough nuts in here today."

"You not only rot people's teeth, you're impolite!" Grell growled. "If I weren't a gentleman..." He shook his fist. Light glinted off a heavy gold ring. It had a letter "G," with lots of curlicues.

Grell stomped out, nearly bumping a man in the doorway. "Here I am, chief," said the man.

"Meet Rip Offenback, my assistant," Leazy said. "Give these kids a tour of the plant."

"Well," said Offenback, "I was just doing some important work..."

"Don't get smart with me!" Leazy yelled.

"Remember who's in charge around here."

"The only reason you're in charge is because you shot down my snack project. Sugar Clouds are much better than those stupid Yummies."

"They gave me the job. So get going!"

## The Gang Tours the Plant

Offenback scowled and marched off with the Gang. "First, the mixing rooms." They went up a flight of stairs and onto a metal walkway.

Below them were giant metal vats full of gray glop. "What is this stuff?" Vikki asked.

"It's how all our snacks start off. This vat here will be made into Yummies," Offenback said.

"Looks like gooey cardboard," Ricardo said.

"Pretty close," said Offenback. "But add fake colors and chemical flavors, puff it up with air, and folks think it's delicious."

"We heard Mr. Leazy say something is wrong with the Yummies," Vikki said.

"Yes. They start off fine, but after they go to the warehouse, they start smelling terrible."

"Do you think we could see the warehouse?"

"You can see it from this walkway," Offenback said. "It's that area with all the boxes."

They came down another set of stairs and walked through the warehouse. All around stood rows of boxes, all carefully dated. "These are new boxes of Yummies," Ricardo said.

"Could we try some?"

"You're awfully interested in Yummies," Offenback said, taking out some samples.

Vikki tasted one. "They seem okay."

"I can't tell," Skip said, blowing his nose.

Then they came to a Yummies box with an old date. "Could we try some?" Ricardo asked.

"You'll be sorry," Offenback opened the box.

"Ick," Vikki said. "Smells like old socks." She put the snack down. "Why did they go bad?"

"If you ask me, it's Leazy's fault. I'll show you why." Offenback led them into a large room.

A huge machine whirled and chugged. Yummies and sheets of plain cardboard rolled into chutes. Out rolled brightly-colored Yummies boxes. "This is the Robox. It makes boxes and puts in Yummies. Leazy thinks it will save money. He put our box-packers out of work."

"Unless they go to Alaska. We heard him on the phone," Skip said.

"I think they're ruining Yummies to get back at Leazy. If they keep it up, he'll lose his job." ➤



Vikki pointed at a fancy letter "G," with curlicues, painted on the Robox. "What's this?"

"The trademark of the company that makes the machine," Offenback said. "Grellco."

"It looks like the ring Mr. Grell wore when he came in and hollered at Mr. Leazy," Skip said.

"You must have seen a lot happening at Leazy's office today," said Offenback, laughing.

"Yes. He had a big fight with Rose Parker."

"Rose the Nose?" Offenback grinned. "That's what we call her. She has the best nose in the business. Give her a product, and she'll create a smell or a taste for it."

"She won't be working here anymore," Vikki said. "She told Mr. Leazy she was quitting."

Offenback looked upset. "Gosh, I hope not. Let's go to the labs. I'll talk to her."

## Rose's Hall of Flops

When they reached the laboratory, Rose Parker was packing a box. "You can't be serious, Rose. It's throwing away years of work."

Rose kept packing. "I've had it with Leazy. About time somebody showed him up."

"You don't sound too fond of him," Vikki said.

"He's giving me grief about his Yummies. Yesterday, he even said my flavor was a flop. Wrong! I know a flop when I smell one." She pointed at a shelf on the wall. It held a group of bottles and a small sign. ROSE PARKER'S HALL OF FLOPS.

Rose smiled. "Up there is an air freshener that smells like horse sweat, a dishwashing liquid flavored like bad potatoes, and a deodorant that smells like old socks. Those are flops. Yummies aren't."

"Ah-choo!" said Skip.

"Ah-choo!" said Offenback. "Better not give me your cold, kid. I just got over one." He turned back to Rose. "Please don't leave."

"Too late," she said. "I have some work to finish up tonight, then I'm out."

Offenback led them back to Leazy's office, and left the Gang to say goodbye to his boss.

"What did you learn?" Leazy barked.

Skip answered. "Yummies smell like old socks."

"That's normal. For a few weeks, they smelled like horses," Leazy said. "But who's doing it?"

"We have lots of suspects," Vikki said. "The packers who lost their jobs to the Robox."

"Humph," Leazy said.

"How about Rose Parker? She's mad at you, and she has a hall of bad smells," Ricardo said.

"And that Mr. Grell owns the company that makes the Robox," Skip added.

"Nobody could tamper with that machine!" Leazy said. "And Grell is just a rich nut. He's involved in all sorts of crazy causes."

"Trying to keep kids from rotting their teeth doesn't sound so crazy," Vikki said.

"Ruining my business sounds crazy to me," Leazy frowned. "How are you going to stop it?"

"You're sure the machine is safe, so that leaves the warehouse. We'll stake it out from that walkway over the vats," Vikki said.

That evening, the Gang ate sandwiches on the walkway. "I can't taste this," Skip said.

"You're not missing much." Ricardo looked at the vat. "This cheese must taste like that goo. It needs some of Rose the Nose's flavors."

"Shush. We're here to watch the warehouse," Vikki said. "Everything's quiet."

As she spoke, the walkway began shaking. "What the..." Ricardo said. Suddenly, the section that they were on fell—dropping them into the vat below!

## Are the Gang members in over their heads?

Find out next month in Part Two of "The Case of the Private Nose."





# Mystery Boxes

We've hidden something in each of the boxes on the cover. Can you figure out what? Use these sense clues to sniff out the answers. Then pick out what's inside from the list.

**Answers on page 37.**

## Box 1

1. This box is light. You can hold it in one hand.
  2. Shake the box. You hear lots of little things sliding around and hitting each other.
  3. As you shake the box, you will also feel something bouncing off of the box's sides.
  4. Open the box a crack and you might pick up the smell of rubber.
  5. Stick your hand in. You feel something smooth and round. You also feel small metal things. Each one has six points sticking out.
- What is it?**

## Box 2

1. This box is long and thin. But it is light enough to hold in one hand.
  2. When you shake this box, you hear something bump against its sides very lightly.
  3. Sniff the box. There's a sweet smell.
  4. Stick your hand in and feel what's inside. One part feels soft inside your hand.
  5. The other part feels long, hard and thin. It has sharp points that can stick you. Ouch!
- What is it?**

## Box 3

1. This box is about the size and shape of a shoebox.
  2. You will see holes in the top to let air in.
  3. Pick up the box. You will feel something bumping against the sides as it hops around.
  4. Poke a finger in one of the holes. You might feel something wet and slippery.
  5. Put your ear to the box and listen. There are strange croaking sounds coming from inside.
- What is it?**

## Word List

baseball	frisbee	record album
baseball mitt	frog	rock
book	ice cream cone	rose
bottle of soda	onion	set of jacks
candle	pair of dice	and ball
carton of milk	pencil	sponge
cat	pepper	tambourine
clock	pizza	water balloon

## Box 4

1. This box is lightweight.
  2. It is warm to the touch. The bottom is hotter than the top.
  3. There's a wonderful smell coming from inside that makes you hungry.
  4. Don't turn the box over. If you do you will hear a thud and what's inside will be ruined.
  5. If you open the box and stick in your finger, you will feel something hot, wet and gooey.
- What is it?**

## Box 5

1. The box is small enough to fit in one hand.
  2. There are no holes because what's inside can come out of the smallest opening.
  3. Open the box slightly and stick in your finger. You feel bits of something no larger than grains of sand.
  4. Taste the grains on your finger. Soon your tongue gets a burning feeling.
  5. Take a deep sniff of what's in this box and—Ah-CHOO!
- What is it?**

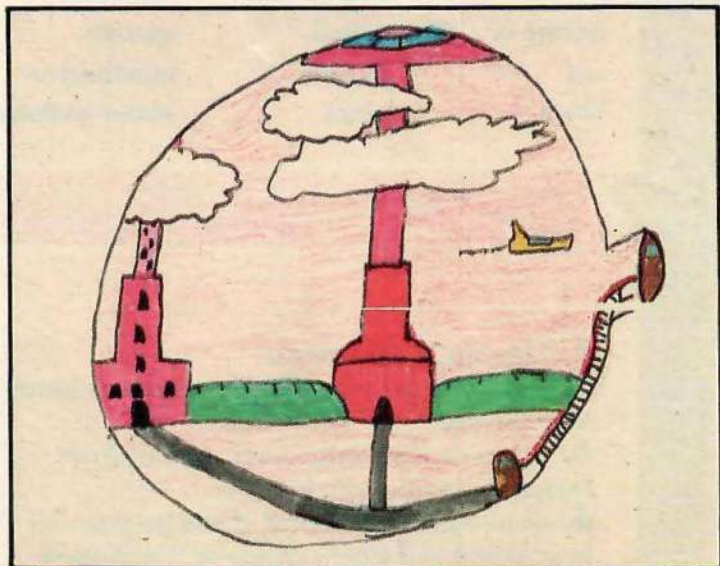
## Box 6

1. You can hold this box in one hand.
  2. Shake the box and you'll hear something bump against its sides. You'll also hear a liquid sloshing around.
  3. Open the box and feel what's inside. It is round and seems dry and smooth.
  4. Press on it and it squishes. But when you stop pressing, it returns to its original shape.
  5. Sniff in the box and detect a rubber smell.
- What is it?**

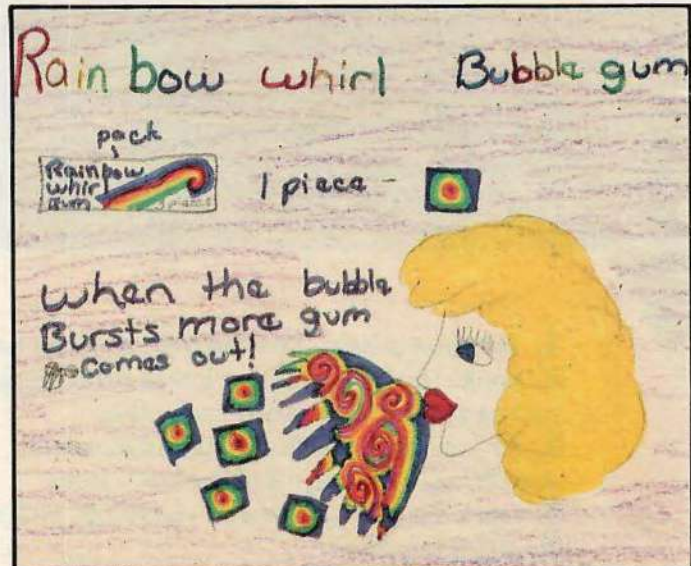


# MAIL

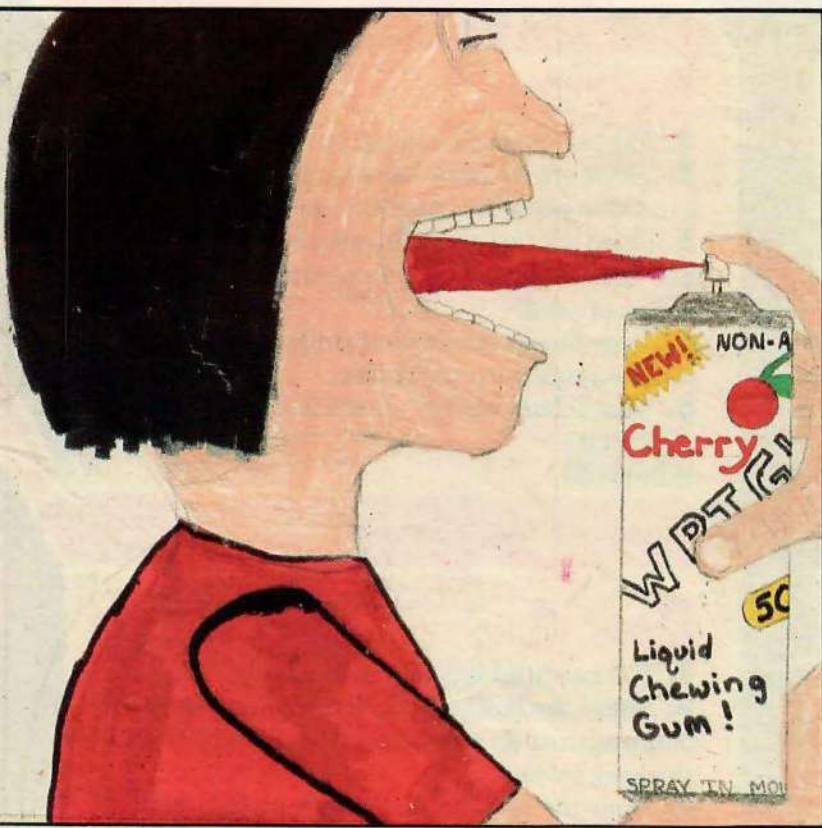
**Gum Gimmick Winners** Last year we asked you to invent some strange and wonderful kinds of gum. You did a terrific job. Here are a few of our favorites.



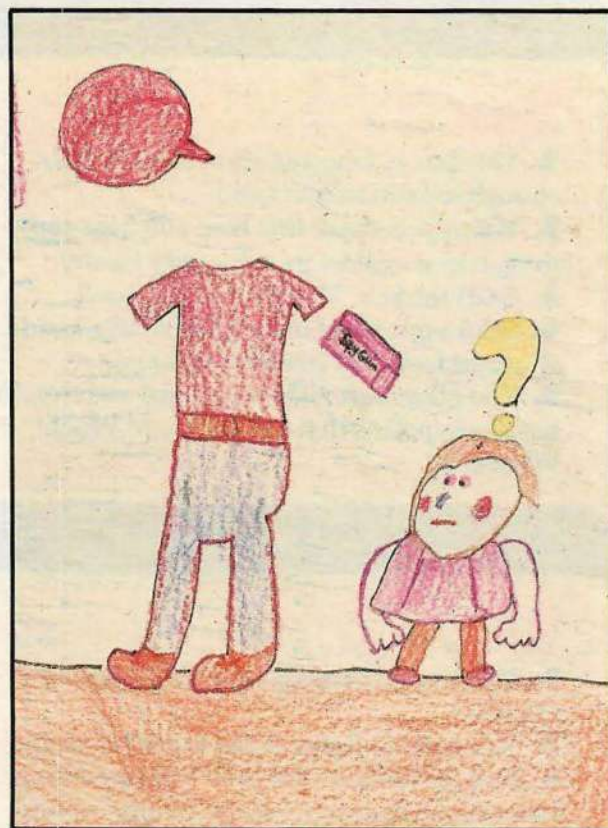
**Eva Susnjär, South Euclid, OH.** Blow the bubble and then climb in it for your fantasy.



**Anne Hansen, San Marcos, CA.** When the Rainbow Whirl bubble bursts, more gum comes out.



**Scott Stowers, Gahanna, OH.** Gum chemicals combine with saliva to solidify the gum.



**Aaron Shell, Kennewick, WA.** Chew Spy Gum and become invisible for a whole day!



# Letters

## A Mini Complaint

Dear 3-2-1 CONTACT,

A correction on the story on miniature horses in your June issue. A miniature horse isn't the right size for a 12-year-old kid. A larger horse would be better.

Christie Sparrow  
Mesquite, Texas

Dear Christie,

You are right. Well, actually you're half right. Some 12-year-olds would be too heavy for a miniature horse. But others wouldn't.

We found out that most miniature horses can carry 60 pounds. Some can even carry as much as 90 pounds. So even though a kid may be 12 years old, what really counts is how much she weighs and not how old she is.

By the way, did you know that miniature horses are also used to pull carts? The Clydesdale, which is 30 inches high, can pull up to 700 pounds in a wagon. What a load!

## Fancy Footwork

Dear 3-2-1 CONTACT,

In your April '83 poster you told about different animals and the farthest distance they jumped. Well, I would like to inform you that you forgot an animal that can even jump farther than a human. A dog! In 1849 a dog named Bang jumped 30 feet in England.

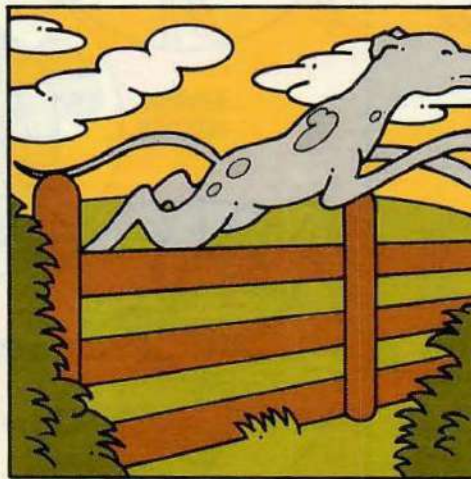
Michele Kratzer  
Rittman, Ohio

Dear Michele,

When we got your letter, we did some checking. We found out that "Bang" was a greyhound. Not

only are greyhounds great jumpers, but they're great runners, too.

In fact, they run faster than any other dog. The record-holder for fastest speed is a greyhound named "The Shoe." In 1968 the dog was timed running more than 40 miles an hour. How's that for a fast fact!



## Mail Complaint

Dear 3-2-1 CONTACT,

I am writing to complain about your mail section. The magazine itself is great. But I am disappointed about the mail section. In some issues you will say, "Remember when we asked for desert survival gadgets?" Well, I don't remember. And then some won't say anything at all. How could you send in pictures if you didn't know what to send?

Ranee Matthys  
Gladstone, Missouri

Dear Ranee,

There is a way to find out what to send to our mail section. Just check out our EXTRA!

department.

And, starting with this issue, we'll give you more details on the mail page. We'll tell you when we asked for your mail and why.

So turn to page 36 to find out the contest in this issue. Then check out page 32 to see this month's winners.

## Try It Out

Dear 3-2-1 CONTACT,

Have you tried the experiments you give us kids to try?

Christina Schiffer

Dear Christina,

Before we put any experiment into the magazine, we want to be sure that it will work for you. So, yes, we do try the experiments we give you.

Sometimes, though, an experiment is a little complicated. To make sure we get everything right, we have some kids try it out for us.

But still, an experiment doesn't always turn out the way we say it will. And that's not bad. It can even be good. A mistake made during an experiment can turn out to be a brand new discovery. And that's what science is about!

## We Want Mail!

Dear Readers,

We really love hearing from you. The questions, ideas and complaints we get help us make CONTACT a better magazine. So why not drop us a line? We can't answer every single letter, but we do read them all. Send your mail to:

3-2-1 CONTACT: Letters  
P.O. Box 599  
Ridgefield, NJ 07657



# Extra!

Hold on a minute. You're not through yet. Check out the extra games, puzzles and things to do on the next few pages.

## Nifty Sniffers

If you watched 3-2-1 CONTACT on television, you saw Kathy visit the factory where they make scratch and sniff stickers. They smell like fruit and other neat things. If you'd like to sniff one out for yourself, you're in luck. We'll send you one. Just mail us a note, asking for the sticker. And stick in a stamped, self-addressed envelope. Send it to:

**3-2-1 CONTACT: Scratch and Sniff**  
P.O. Box 599  
Ridgefield, NJ 07657



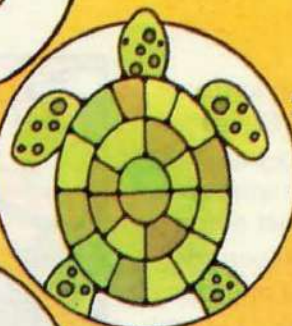
## Scrambled Eggs

Are you an eggs-pert after reading Any Questions? Here are some facts about animals and their eggs that will test your egg IQ. See if you can match the animals with the right information about them.



**OSTRICH**

**1.** These insects live in large groups. A queen lays all the eggs. She can lay up to 30,000 of them at a time.



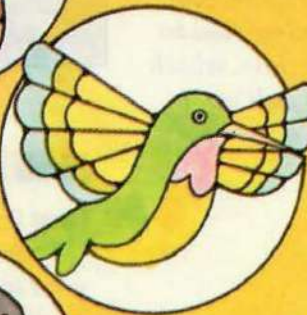
**GREEN TURTLE**

**2.** They lay 50 to 100 eggs at a time. Each has a leathery shell. The two-and-a-half-foot (.75-m) long babies curl up inside.



**TERMITE**

**3.** It is one of only two mammals that lay eggs. The eggs are small and rubbery, and only two are laid at a time.



**DEE HUMMINGBIRD**

**4.** It is the largest fish, and it lays the largest eggs of any creature. They are 1 foot (.3 m) long.



**WHALE SHARK**

**5.** This 9-foot (3-m) tall bird lays the largest bird eggs. Twenty chicken eggs could fit inside one of them.



**PYTHON SNAKE**

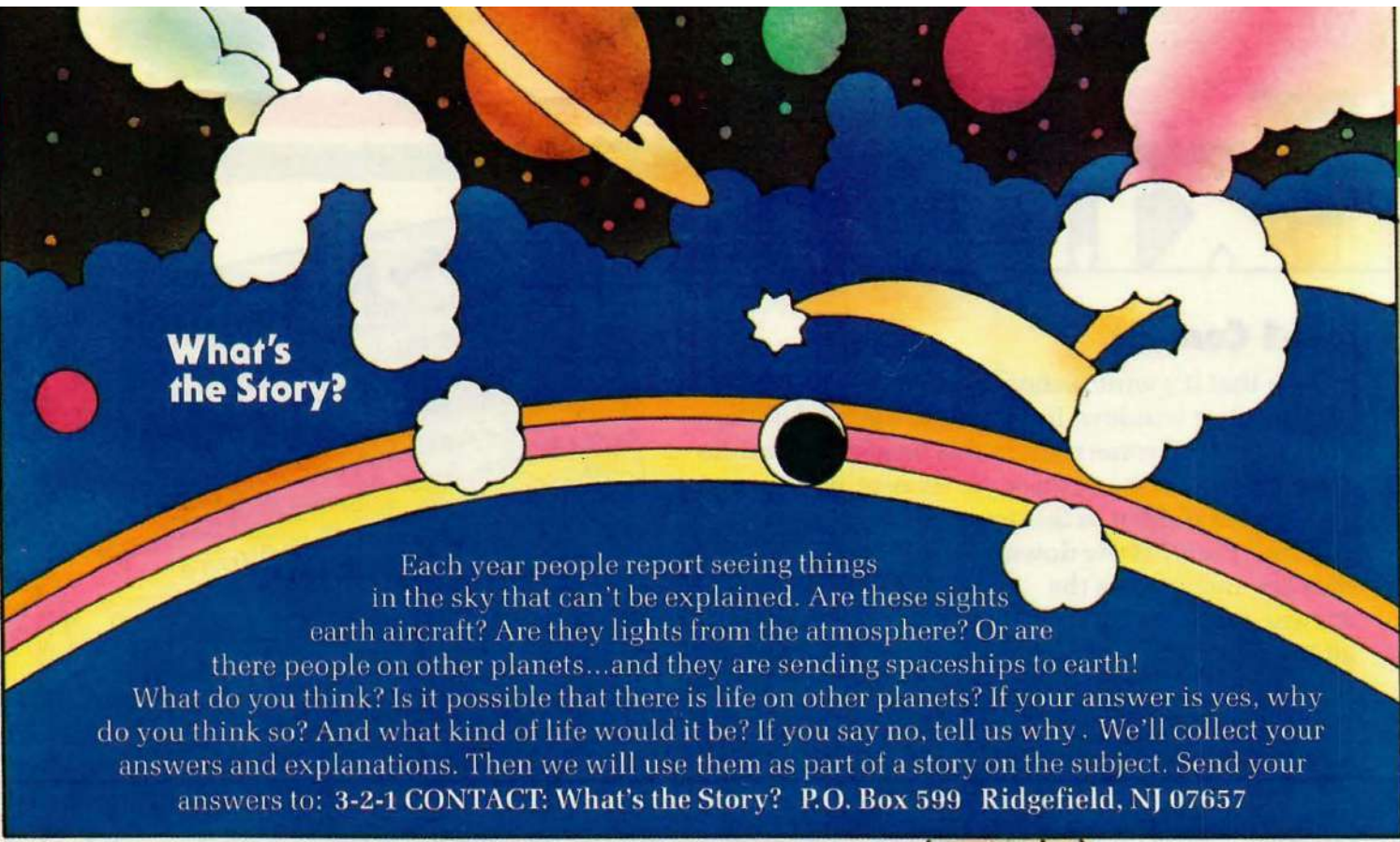
**6.** The world's smallest bird, its eggs are so small, they could fit inside a thimble.



**PLATYPUS**

**7.** This 300-pound (135-kg) animal lives in the sea, but it lays its eggs in holes on sandy beaches.





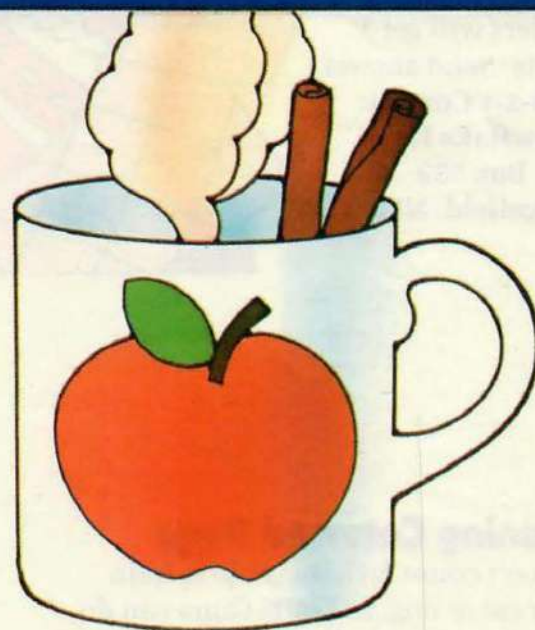
## What's the Story?

Each year people report seeing things in the sky that can't be explained. Are these sights earth aircraft? Are they lights from the atmosphere? Or are there people on other planets...and they are sending spaceships to earth! What do you think? Is it possible that there is life on other planets? If your answer is yes, why do you think so? And what kind of life would it be? If you say no, tell us why. We'll collect your answers and explanations. Then we will use them as part of a story on the subject. Send your answers to: 3-2-1 CONTACT: What's the Story? P.O. Box 599 Ridgefield, NJ 07657

## Some Like It Hot

What goes better on a cold, frosty winter day than a hot, steaming drink? If you like apple juice, you'll like it even better hot. Add a touch of spice and it's even more delicious.

Just put some of your favorite bottled apple juice into a pot. Add a few whole cloves and a stick of cinnamon. Now heat it slowly until the juice begins to bubble. Use a pot holder and pour it carefully into mugs. Enjoy your spicy, hot apple juice!



## Some Like It Hotter

Whether you drink hot apple juice, hot tea or hot cocoa, you want it to stay warm as long as possible. What kind of container will keep it warm longest? Do a little experimenting to find out.

Get a glass jar, tin can, plastic cup, paper cup and styrofoam cup. Put them all in a low box and pack crumpled newspaper around them. The cups shouldn't touch. Now fill each with an equal amount of hot water from the sink. Measure the temperature in each container with a thermometer. Write it down. Wait a half hour and measure again. Which container held heat longest? Now you know what kind of glass or mug will keep your hot drinks the hottest.



# Extra!

## 3-2-1 Contest

Now that it's winter, there may be snowflakes outside your window. But if you're a good detective you might find some right in this magazine. Besides the ones you see here, there are three other snowflakes hidden in this issue. Can you find them? Write down where

they are and send us the answer. We'll throw all the right answers into a box, then pick five without looking.

Those snowflake finders will get T-shirts. Send answers to: **3-2-1 Contest: Snowflake Hunt**  
P.O. Box 599  
Ridgefield, NJ 07657



## Now You See It...

Are you thinking of sending cards to friends for the holidays? Why not make them yourself? You can use a special trick to give the cards an unusual twist.

Fold a small piece of white paper in half. Now, here's the secret. Squeeze out the juice of a lemon. Then dip in a toothpick and write your message in lemon juice. When the juice dries, your message will be invisible. Stick a note in the card telling your friend to hold the card over the hot bulb of a lamp. The message will appear in brown.

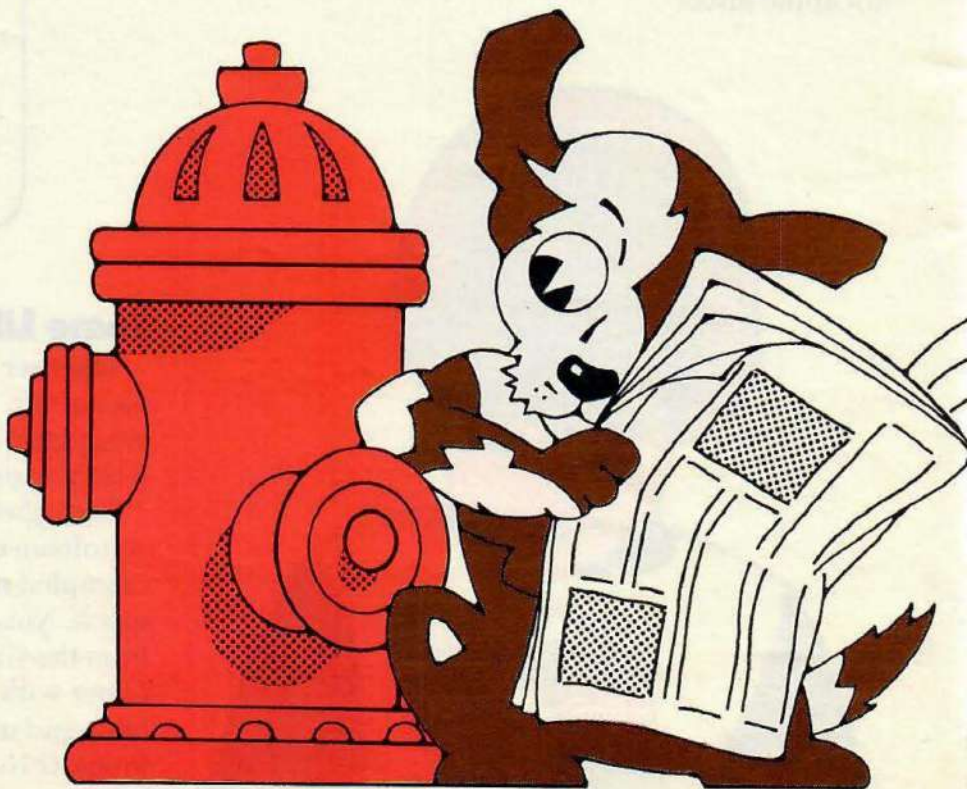
Do the same thing with decorations. Draw a snowman with colored pencil on the front of the card. Then draw a smiling face with lemon juice. When the paper is held over the bulb, the snowman's face will appear. Try signing your name in lemon juice. Your friend won't know who sent the card until the secret writing appears.



## Training Cats and Dogs

Don't count on being able to train your cat or dog, as Linda Gunn can do, to wake you up in the morning or answer phones. But there is one thing you can teach your young pet that is simpler and just as important. That's when and where to go to the bathroom, also known as housebreaking. The ASPCA has two free pamphlets that tell you exactly what to do—and what not to do. Send a self-addressed, stamped envelope and ask for either "Housebreaking a Cat" or "Housebreaking a Dog." Write to:

**ASPCA: Education Department**  
441 E. 92 St.  
New York, NY 10028





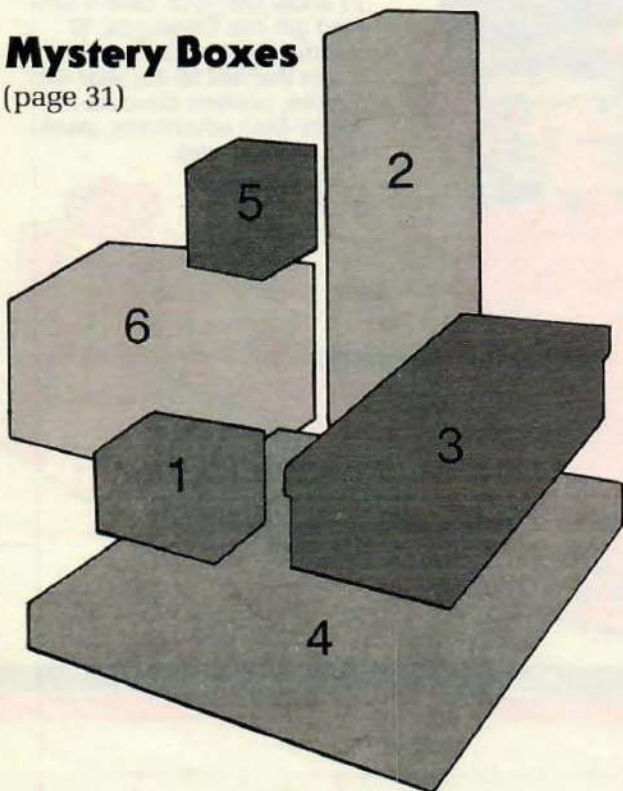
# Did It!

## Tips for Eye Tricks (pages 20-21)

3. On the left you'll see a rhinoceros and, on the right, a chameleon. Both are looking straight at you.
4. From a distance, you'll see a horse.
5. An elephant is coming right at you.

## Mystery Boxes

(page 31)



- |                     |                  |
|---------------------|------------------|
| 1. JACKS AND A BALL | 4. PIZZA         |
| 2. ROSE             | 5. PEPPER        |
| 3. FROG             | 6. WATER BALLOON |

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## Scrambled Eggs (page 34)

- |                 |                    |
|-----------------|--------------------|
| 1. TERMITE      | 5. OSTRICH         |
| 2. PYTHON SNAKE | 6. BEE HUMMINGBIRD |
| 3. PLATYPUS     | 7. GREEN TURTLE    |
| 4. WHALE SHARK  |                    |

## Thank You!

Thanks to William G. Hyzer for help with the high-speed photography story. Thank you to student intern Mary Tota for help in preparing this month's issue.

## Next Month!

Here's a sample of what you'll find in the next issue of 3-2-1 CONTACT:

### Astronaut Camp

At a camp in Alabama, kids learn what it's like to live in space.

### Disappearing Dinosaurs

Find out how people explain the mysterious disappearance of dinosaurs.

### Bloodhound Gang

Vikki, Ricardo and Skip solve their latest case.

**Plus Factoids, Letters, Mail, a Quiz and More!**



# Perfect gifts for Christmas

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Treat your favorite pre-schoolers to a year of fun-filled learning, with a gift subscription to Sesame Street Magazine.

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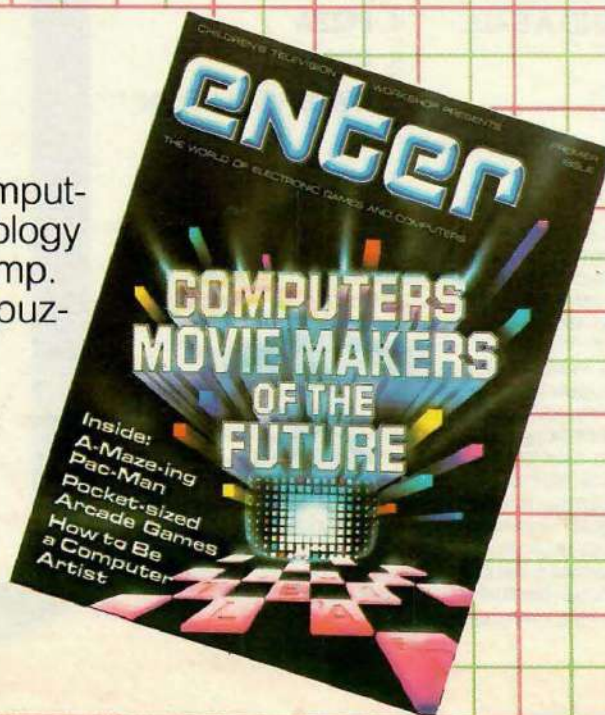


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## Earthfacts: Mesas and Buttes

Each month CONTACT will bring you another Earth Works. Save these pages in a notebook. Soon you will have your own guide to the wonders of the planet earth.

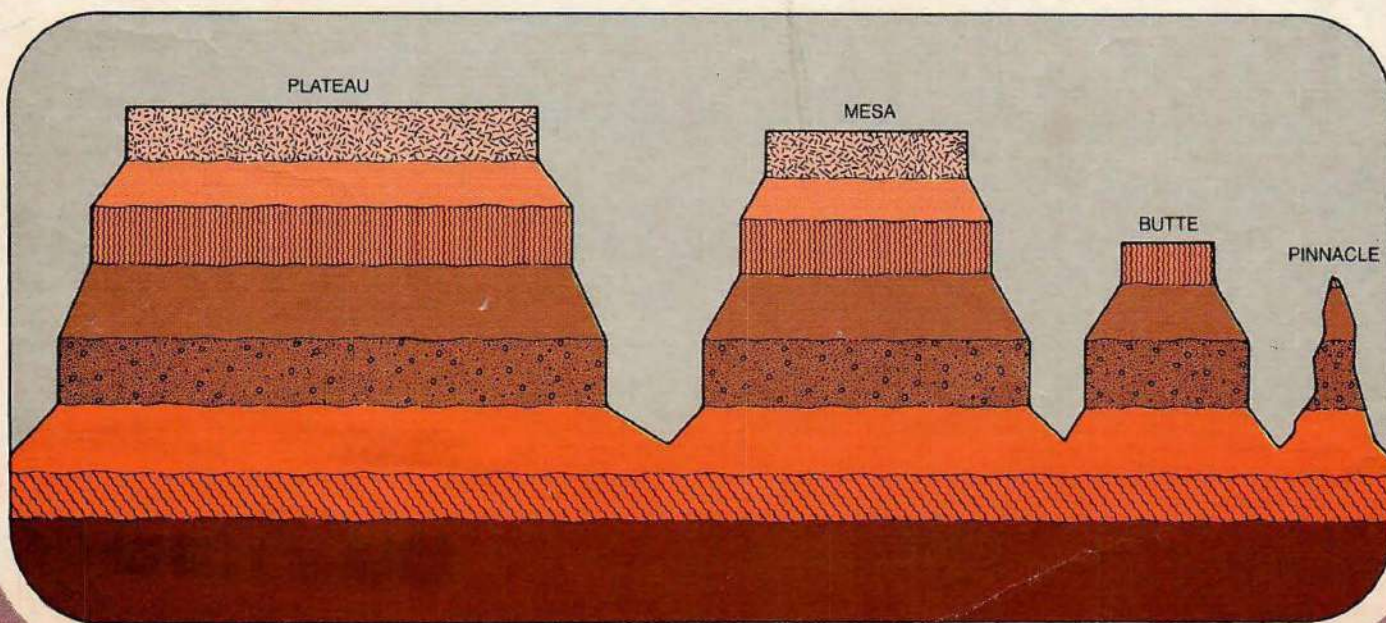
# EarthWorks

- Hundreds of years ago, Spanish explorers crossed the American desert. There they saw strange steep-sided rocks that towered over the land around them. With their flat tops, the rocks looked like tables. So the Spanish gave the rocks the Spanish name for table—*mesa* (MAY-suh). Smaller mesas are buttes (bYOUts).
- Mesas and buttes are found in deserts in places like central Australia and southern Africa. But some of the most well-known ones are in the desert of the southwestern United States.
- It takes water, wind and millions of years to make a mesa or butte. Those of the American desert were once part of a high flat area called a plateau (plat-TOE). Rain, streams and wind ate away at the plateau's rock. Some rock was softer, so it wore away more easily. Other types of rock were harder. Pieces of the harder rock were left behind, sticking up over the rest of the land as mesas and buttes.
- Mesas have sharp, squared-off shapes. But as they wear away into buttes and pinnacles, their shapes can become even more weird. People of the American desert have thought up strange names to describe these standing rocks. There's Elephant Butte, Teapot Dome, Montezuma's

Head and the Mittens, to name just a few.

- The tops of mesas and buttes are dry and barren. The desert sun beats down on them. Strong winds whip across their surfaces. Some grasses and a few plants can grow there. But they grow far apart to get enough water. Flowers that grow on mesas and buttes open at night, so they don't dry out in the hot sun. Most animals can't survive such a harsh environment. Only little creatures, such as lizards and pack rats, can live there. But one advantage is protection. Who would climb up to bother them?
- A mesa that did serve as a home for people was Mesa Verde in Colorado. Anasazi Indians built stone apartments on it hundreds of years ago. They left mysteriously. No one knows why.
- One pinnacle in Arizona's Superstition Mountains is Weaver's Needle. There is a tale that a man once found a gold mine somewhere near it. No one knew where. But when the man died, he said the Needle could be seen from above his mine. Hundreds have searched for the gold for years. No one has found it yet!

**Below:** The process of erosion turns plateaus into mesas, then buttes and, finally, pinnacles.





**EarthWorks**



## Mesas and Buttes

This winter desert landscape is part of Monument Valley, Arizona. It's not your ordinary desert. If you go there, you'll see many strangely-shaped rocks rising above the desert floor. They are called *mesas* and *buttes*. Some look like towers, spires or people. One even resembles a teapot!

Wind and water formed these rock sculptures. They did it by eroding the rock over millions of years. That process is still going on right now. The shapes of the rocks are changing, though too slowly to notice.

For more on mesas and buttes turn to page 39.

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